

THE AUTOMOBILE

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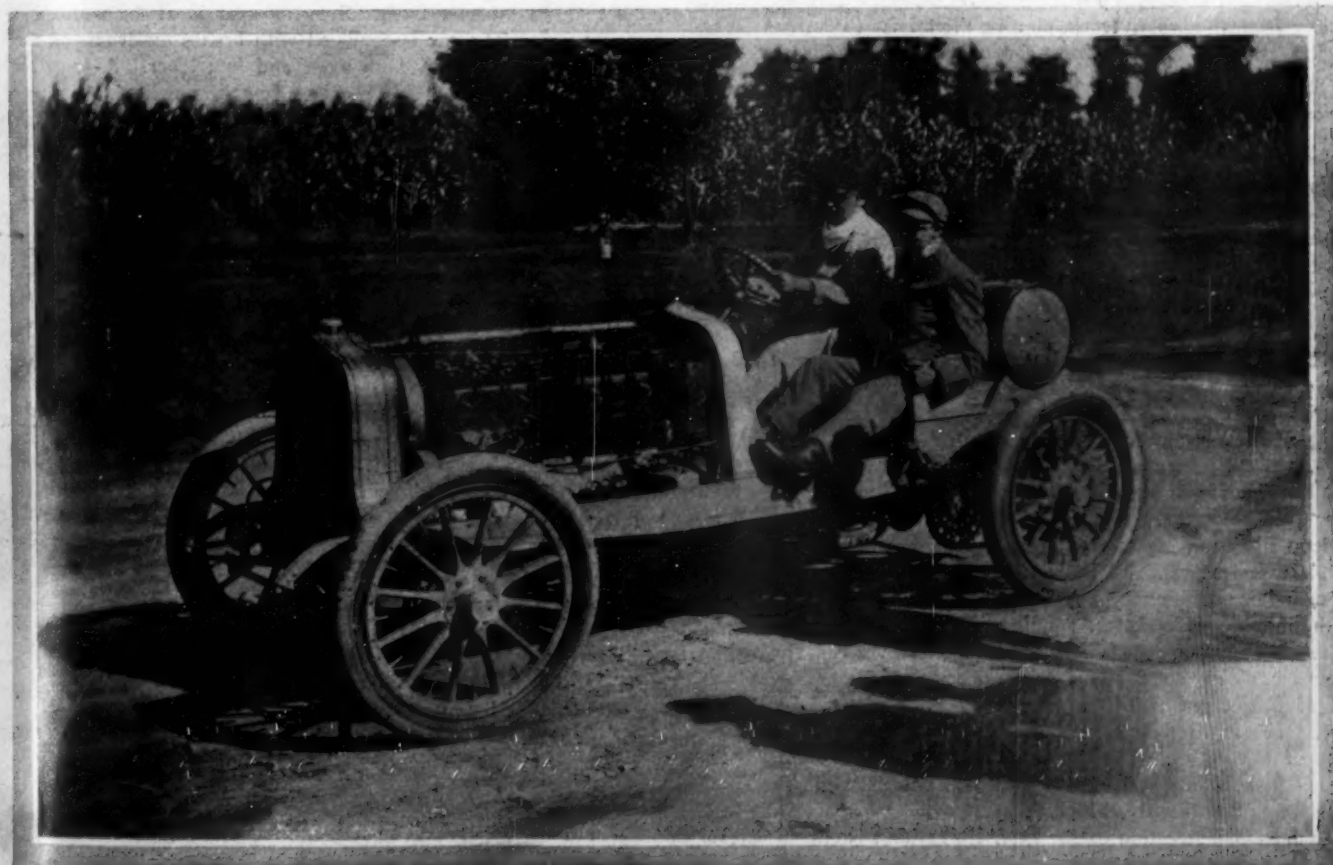
No. 10

AMERICAN CARS THAT SEEK CUP HONORS

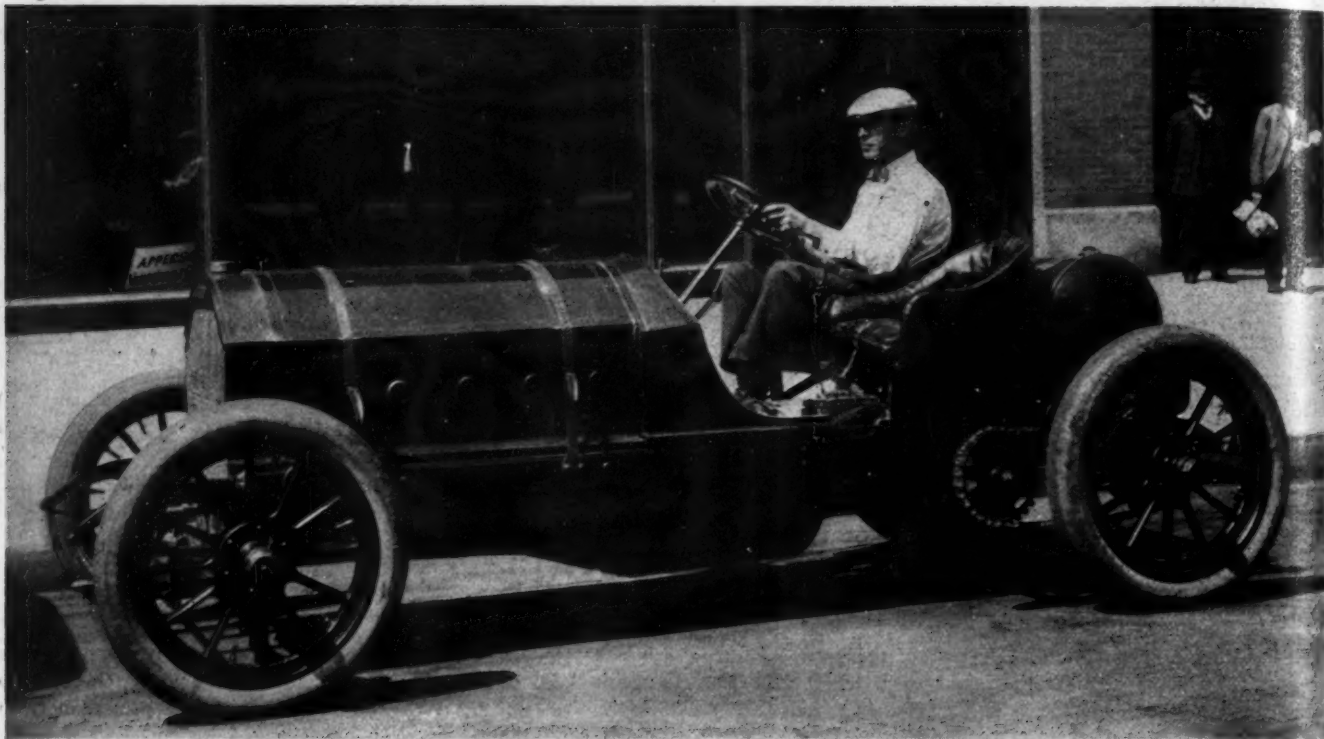
PERHAPS the most noticeable feature of the group of fifteen American candidates for the honor of racing for the Vanderbilt Cup is the strong tendency of the builders to adhere to the characteristic features of their respective touring cars. There is not a car in the entire fifteen that does not carry some feature that is embodied in its maker's pleasure cars; most of the cars are practically enlargements of touring cars, with such changes as have been found necessary in increasing power; and a few are actually stock touring cars, stripped, fitted with racing bodies and equipped with racing conveniences. Of the two builders whose racing cars differ widely from their touring machines, one

is a newcomer in the field and the other builds cars of a type unsuited for road racing without radical changes. There is no doubt that while road racing has had its effect on American stock cars, the touring car has changed but little in donning racing garb—a fact that speaks volumes for the principles upon which our cars were built even before there were great road races here as there are abroad.

Stock car design prevails in the 1906 American cup candidates to a far greater extent than in 1905, and there is a marked tendency to adopt a general outward appearance that makes it difficult to differentiate between some of the cars without looking



POPE-TOLEDO 120-HORSEPOWER VANDERBILT CUP RACER, WITH DRIVER LITTLE AT THE WHEEL.



EDGAR APPERSON AT THE WHEEL OF THE APPERSON 80-HORSEPOWER TOURING CAR VANDERBILT RACER.

for identifying details. Last year nearly every car stood by itself owing to some bold distinguishing characteristic; this year there seems to be an almost general acceptance of a form that has been evolved by actual service and has proved, at least to the satisfaction of the majority, to be best suited to the work. The presence of a little group of cars whose builders have struck out boldly from the beaten track, pinning their faith to designs differing in essential features from the conventional, adds a note of interest to the trials and a piquant flavor of uncertainty; for who will say that some persistent genius may not build a car that will outstrip the machines of his more conservative rivals? This is an ever-present possibility that adds zest to the elimination trials. It is quite safe to say that the five cars that make the best showing in the 300-mile sprint that will grind out the cup racers will be fully entitled to the honor and glory they will receive, whether they prove to be winners or losers in the final great struggle for the huge silver cup.

Pope-Toledo Racer Now En Route for the Course.

The Pope-Toledo entered in the Vanderbilt Cup race, to be driven by Herbert Lytle, has arrived in New York, having been shipped from Toledo the latter part of last week. Bert Dingley, who last year drove the Pope-Toledo in the elimination race, will this year act as mechanic for Lytle. The car is 120 horsepower and the general construction is in keeping with all the new features that will be embodied in the 1907 Pope-Toledo stock touring car. The motor is four-cylinder, with twin heads cast integral, and individual water jackets for each pair of cylinders; ignition by gear-driven magneto. The car is fitted with multiple disk clutch, running in oil, and with a selective transmission, four speeds forward and one reverse. The valves are mechanically operated by walking beams on the head, with one set of four cams and four push rods. The racer differs from next year's touring car in one essential particular—it has a wheelbase of 104 inches, while the stock models will have wheelbases of 115 inches, and the racer has 34-inch wheels while the stock cars are equipped with 36-inch.

The steel construction of the racer throughout is chrome nickel steel, with a tensile strength of 225,000 pounds to the square inch. Frame, sprockets, chain, axles, etc., are made of this material.

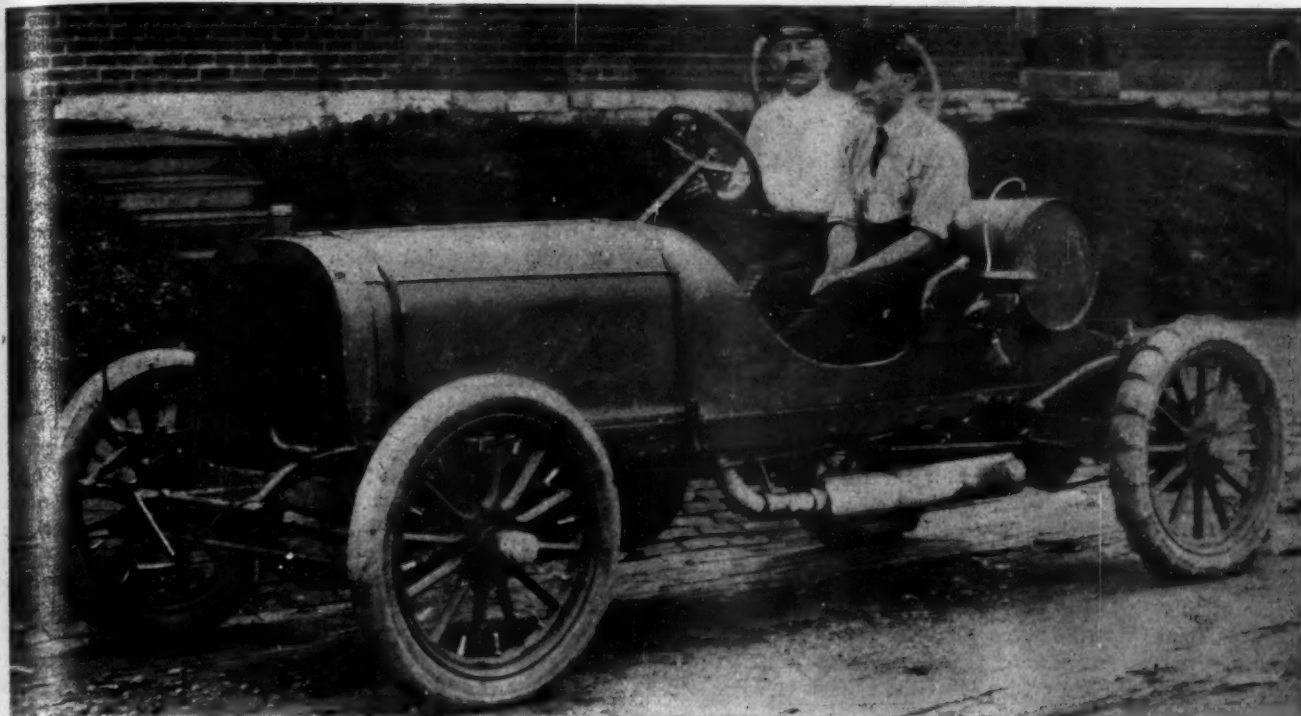
Mechanical Make-up of the Apperson Racer.

The Apperson car is of the four-cylinder type, nominally rated at 80 horsepower at 1,100 revolutions per minute. The car is of the chain drive pattern; four-speed selective transmission; wheel base 110 inches, tread standard. The tire dimensions are 34 by 4 1-2 rear, 34 by 3 1-2 front. Steering gear is of the worm and segment type. The car is equipped with brakes on drums on the rear wheels operated by both hand and foot lever. A 30-gallon gasoline tank in the rear of the seats, also with 5-gallon lubricating oil tank, both under air pressure, are fitted on the new machine. The frame is of special rolled nickel steel and is hand made; the axles are hand forged of chrome nickel steel. Wheels are fitted with forged steel hubs and Hess-Bright American-made bearings. Cylinders are cast separately with water circulating pump, driven from the end of the camshaft without gears. The ignition is by the special double system patented by the Apperson brothers, each system being entirely independent of the other; one is operated by storage battery and coil and the other by high-tension magneto, firing the gas simultaneously by a multiple series of spark plugs. The clutch is of the compression band type, a duplicate of the standard clutch used by the company on their regular cars. The engine is covered with an aluminum bonnet both above and below and is cooled by the large steel flywheel with propeller blades. The radiator is also equipped with the regulation fan. The car is geared to run 85 miles at 1,250 revolutions of the motor. The weighing-in weight of the car is about 2,200 pounds.

A despatch from Laporte, Ind., under date of August 30, states that Edward Apperson, of Apperson Bros., was severely injured while trying out the racer on the roads at that point, owing to the bursting of a tire. Mr. Apperson was rendered unconscious by the accident, but fortunately suffered no broken bones. The chauffeur with him at the time was uninjured. Although the car was ditched by the accident it suffered no material damage.

Tracy Will Again Pilot the Locomobile Machine.

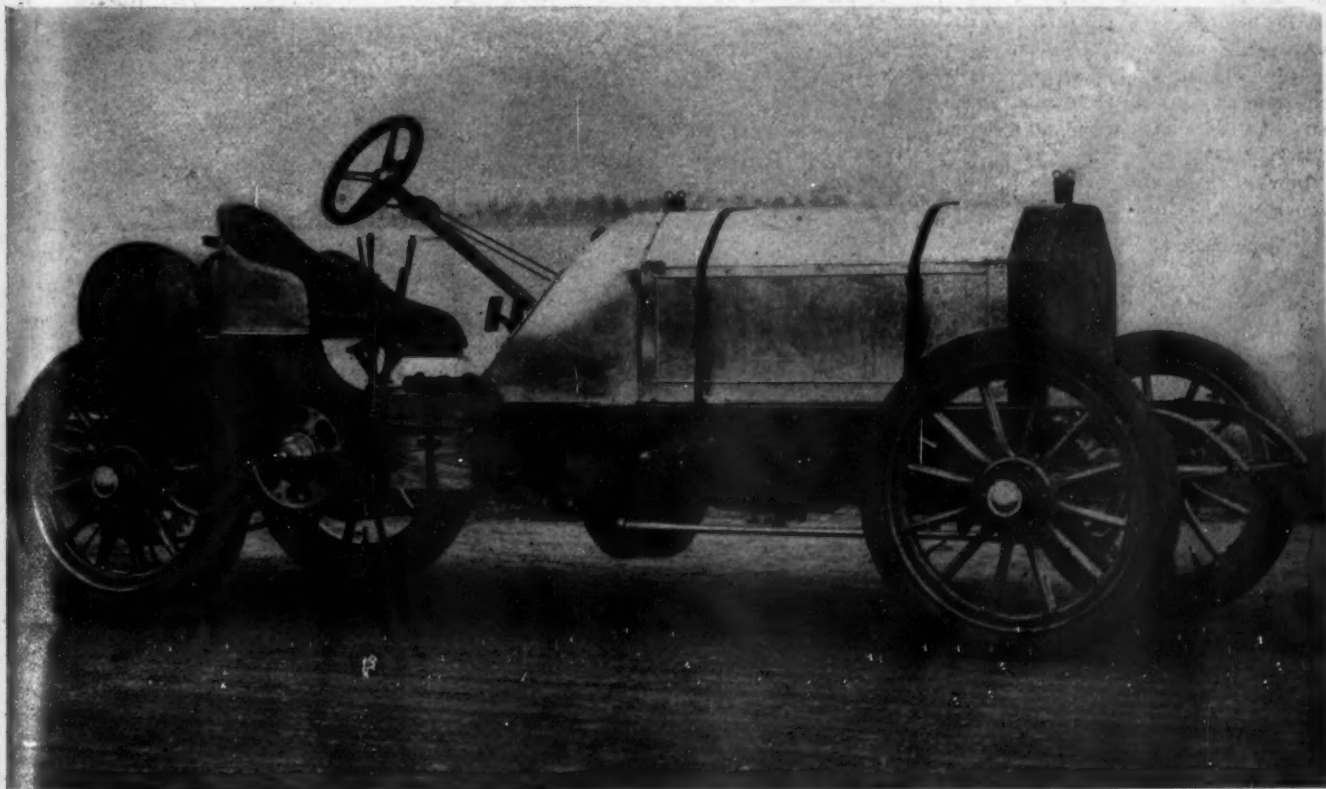
The 1907 Locomobile racer entered in the elimination trials for the selection of the American team for the Vanderbilt Cup race is conservatively rated at 90 horsepower. The motor is 7 1-4 inch



HAYNES 50-HORSEPOWER RACER. THIS IS A STOCK TOURING CAR FITTED WITH RACING BODY.

bore by 6 inch stroke, make-and-break ignition with low tension magneto. The admission valves are located on the top of the cylinders in aluminum housings and operated by walking beams, the tappets for which are given vertical motion by cams on the admission camshaft, which is inclosed and driven by a gear. The ignition cams are also located on the admission camshaft. The pump and magneto are located on the exhaust side of the motor and run on a shaft which is driven by a gear in mesh with a gear on the exhaust camshaft. The timing gears are located at the rear of the motor.

The transmission provides three speeds and reverse with direct drive on three speeds. The final drive is by double side chains on the rear wheels. The running brake is located on the differential shaft and is operated by a foot pedal, and the emergency brakes are carried on the rear wheels and are operated by a hand lever. The car is practically an enlarged Locomobile touring car with the exception of the admission valves, which are placed on the tops of the cylinders in order to save weight. Two cars are being prepared so that one may be held in reserve in case of any accident. The car is to be driven by Joseph Tracy,



LOCOMOBILE 90-HORSEPOWER RACER WHICH BEARS A STRONG RESEMBLANCE TO THE 1905 RACER.

who will be accompanied by Al Poole—same team as last year which in the Vanderbilt Cup race secured third place in the race and placed America second by countries, having defeated twelve out of fourteen foreign cars.

Haynes Company Enter a Regular Stock Model V.

In entering a regular stock car in the Vanderbilt elimination trials the Haynes Company, of Kokomo, Ind., has adhered to its declared policy of demonstrating the possibilities of the machines which it will place on the market for 1907. The Haynes Vanderbilt racer for 1907 is the second racer built by this concern as a candidate for the cup, and will be known as Model V. It is rated at 50 horsepower and weighs 2,194 pounds, stripped for action, has a 5 1-4-inch bore by 6-inch stroke, and is designed to develop a speed of over 75 miles per hour at 1,200 revolutions per minute.

The car will be driven by John W. Haynes—whose well-known ability as a driver should insure a place well up at the finish. Elwood Haynes, who is responsible for the Haynes entry, is a pioneer manufacturer. On being asked why he did not build a car of great horsepower, like most of the other manufacturers, stated that he believed the car entered would average a very high rate of speed for the entire distance; that primarily the object of a race of this kind is to develop the motor car industry, and Mr. Haynes thinks that the purpose is best served by entering a machine of the regular class and proving its worth rather than a specially built racer. He predicts that the Haynes will be able to prove that it has the speed necessary to make a good showing in a race of this kind and the strength to withstand the strain.

Twelve-cylinder Maxwell a Radical Departure.

With the appearance on the road of the twelve-cylinder Maxwell racer last week there was represented more novelty in construction than has ever yet appeared in any two racing automo-

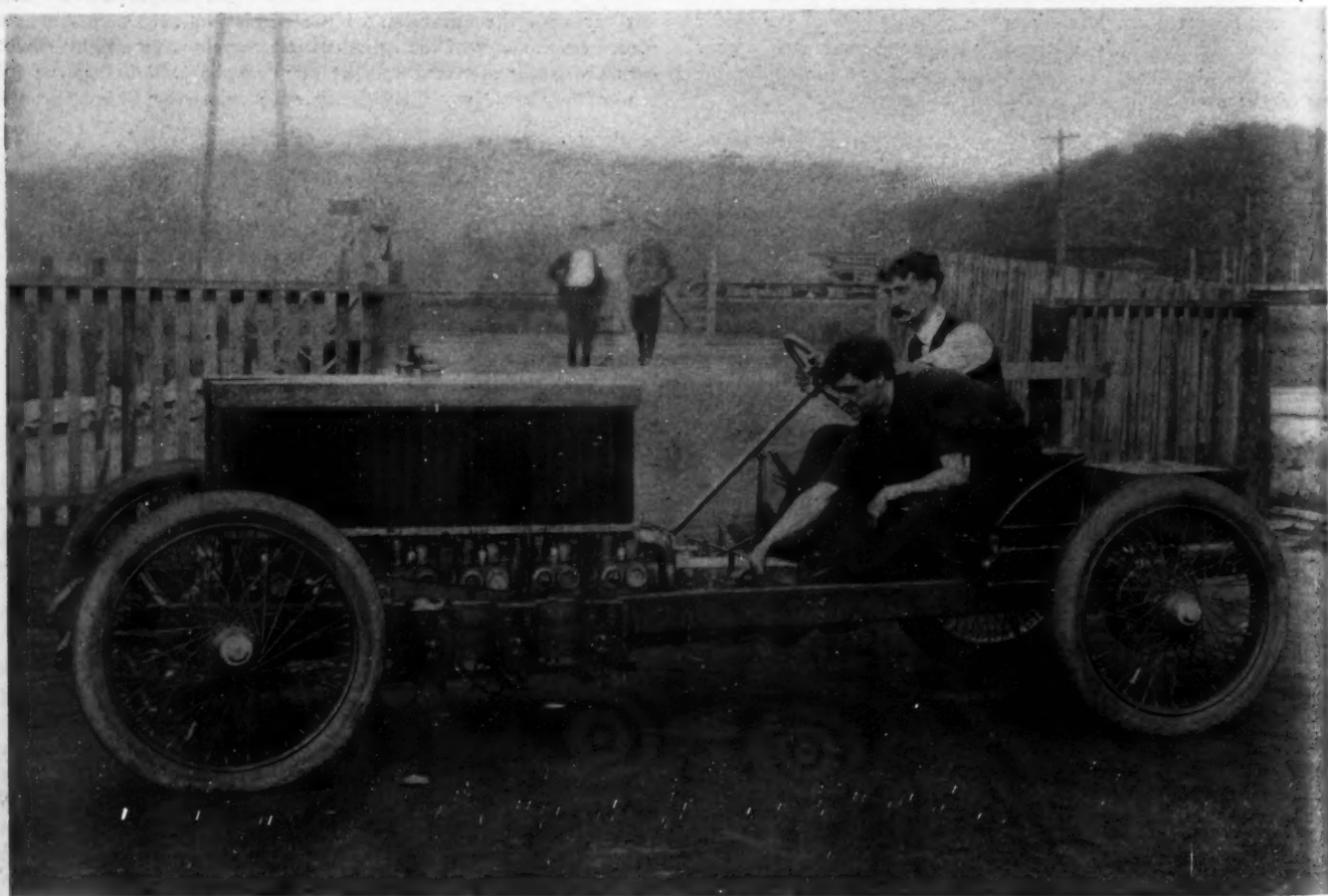
biles. The term "novelty" in this case means a distinct departure from the mere following of some other construction, and more than all it means that there is a well-defined purpose in each instance where it appears. The radical feature of the new racer (notable from every standpoint of gas engine designing) which strikes one most forcibly is the absence of a flywheel.

While the position of the two radiators, one each side of the forward frame, is striking and new in American racing cars, the real novelty in connection with the radiators is not only that no water pump is used, but there is not even the double pipe system of "one for the feed and one for the return." Instead of those heretofore accepted methods of circulating the water, each cylinder head, at a point over the exhaust valves, has a short length of pipe, of large area, running straight up to the bottom of the cooler.

The cylinders are opposed, with the slight staggering of this type of construction to bring the big ends of the connecting rods in pairs on the crankshaft. The order of explosions in the order of cylinders along one side and commencing at either end of the battery of cylinders, is 1, 11, 3, 7, 5 and 9, and on the other side, commencing at the same end, 10, 2, 12, 4, 8 and 6.

The drive is through a multiple disk clutch and propeller shaft with a bevel pinion, to the bevel gear on the rear shaft, and without a differential. There are two speeds and reverse, the casing for the crank, clutch and change gears being in one straight through aluminum casting, carried on a three-point suspension. The ratio of drive is 1 to 1 1-2. Wire wheels are used, 34 by 4 front and 34 by 4 1-2 rear. The wheelbase is 115 inches and the tread standard 56 1-2 inches.

The new car, together with the eight-cylinder, is being tried out each day on the roads around Tarrytown, with the purpose in view of deciding which of the racers is to carry the Maxwell colors in the elimination trials.



MAXWELL 80-HORSEPOWER 12-CYLINDER RACER WITH WIRE WHEELS, TWO RADIATORS AND NO FLYWHEEL.

A CAPE MAY A. C. EXPLANATION.

When the entries for the American Elimination Trial were announced there was some surprise at the absence from the list of two nominations by the Cape May Automobile Club, it having been exploited somewhat prominently that Charles J. Swain and John N. Wilkins, Jr., two well-known members, would be sponsors for two Stanley racers. From Secretary "Jack" Hiscock comes an explanation that herewith follows:

Editor THE AUTOMOBILE:

A few days prior to the closing of entries for the American Elimination event, it was definitely reported in Philadelphia's automobile circles that Charles J. Swain and John N. Wilkins, Jr., both enthusiastic autoists in the best sense of the word, had purchased "kettles on wheels" of the Stanley type, and, through the Cape May Automobile Club, had challenged for the trophy. But one definite detail came to light immediately following these reports, and this was nothing less than the official list of entries published by the Racing Board of the American Automobile Association, and in this neither Stanley cars nor the Philadelphia owners mentioned had a place.

Perfect quiet had been maintained in the whole matter by the parties immediately concerned until the aspersions cast upon the integrity of the Philadelphians in the premises made their position positively untenable, and now both Messrs. Swain and Wilkins, to say nothing of the Cape May Automobile Club, desire to clear up the mystery.

In the first place, the blame belongs to F. O. Stanley, of Newton, Mass., and verbal and documentary proof convicts him.

"Preliminary negotiations for the purchase of two Stanley steamers, guaranteed to do a mile in thirty seconds, and capable of standing up for the Vanderbilt Cup car journey, were made by Mr. Wilkins and myself with Mr. Stanley early in May," said Mr. Swain at his Philadelphia office last week. "The cars were to be tuned up for the meet at the Readville, Mass., track, and, following the directions from Mr. Stanley himself, we were on hand at Readville on Decoration Day to witness their performances, fully expecting, as we had been assured, that the cars would come up to guarantee. Here is an interesting portion of Mr. Stanley's letter, written to me before I left for the races:

"We are very much pleased that you are coming on for the races, as we are confident we can show you something interesting. There will in all probability be six starters in the race and the starters are divided into two classes. One has H. L. Bowden's 90-horsepower Mercedes, Hilliard's 80-horsepower Napier, and Frank Durbin with one of the Vanderbilt cars (Stanley). The other section has an 80-horsepower Mercedes with Downey as driver, Harding's 90-horsepower De Dietrich, and the other Stanley car, driven by Fred Marriott. We were very much disappointed when the entries were published that they did not enter the 80-horsepower Darracq car which won the Vanderbilt race last year, as we desired very much to give Stevens a dose that he would remember. You can see from the above list that we are up against it in a manner suitable to test the power of the cars.

"We entered one of the cars in the hill climb at Worcester, and the day before the race took the car up and went over the course, but we concluded that it would be very poor judgment to go into the race the next day, as a car of that power if driven anywhere near its capacity would very likely have been smashed up."

"The automobile world knows what happened that day," continued Mr. Swain. "Mr. Wilkins witnessed his so-called world-beater lead Bowden's 'Flying Dutchman' for two miles, only to be ignominiously lapped on the ninth circuit. Marriott drove my car against the Fiat Junior, which broke down and so he took the heat. Then Marriott refused to go against the Mercedes in the final, as it was apparent that the car would not hold steam.

"Mr. Stanley had insisted from the outset that we should enter the cars, as he admits in his own letter we had purchased, in the Vanderbilt Cup contest, and we had signified our set purpose of so doing from the outset of negotiations, and, notwithstanding their disappointing showing on that day, he said to Mr. Wilkins, 'Go right ahead as though the cars are a success. What we need is forced draught, and that we will have. You make good with the entries and I will make good with the cars.'

"I wrote Mr. Stanley upon my return to Philadelphia, asking him two or three pertinent questions as to the feasibility of the forced draught, and limited consumption of gasoline and water, and this letter, as I subsequently learned from the factory, was forwarded to Denver, Col., where Mr. Stanley had gone entirely unbeknown to Mr. Wilkins or myself. We went ahead with our arrangements, however, as we were thoroughly satisfied that our cars would not only be on hand for the event, but would come up to guarantee, placing absolute reliance upon the assurance of the man responsible for them.

"We appeared at a regular meeting of the Cape May Automobile Club, and assured the membership that our cars would worthily represent the organization if entered for the Vanderbilt contest, and a resolution was unanimously passed authorizing such action. Entrance blanks were filled out and two checks for \$1,000 apiece were drawn to cover the entrance fees. There were several days to elapse before the entries closed, and as a final precaution I telegraphed Mr. Stanley, asking when we might expect the cars, and if everything was all right. Remember, we had had no word from him after his sweeping assurance at Readville, and you can imagine my surprise when I received a telegram from the Stanley Motor Carriage Co., saying, 'Do not enter cars. See letter.' Then came a letter from Mr. Stanley himself, dated Eslet Park, Col., in which he stated that owing to indisposition he had been obliged to leave hurriedly for the West and expected to remain there till fall. But here is the vital feature of the communication, so far as we and our cars were concerned:

"In reference to the machines, I fear, owing to my absence and the fact that my brother will be away more or less this summer, we shall be unable to complete them in season for the Vanderbilt races. Hence, of course, you are under no obligation to buy them. I fear this will greatly disappoint you and Mr. Wilkins, as, of course, it does me. There is no doubt but the machines can do all that we expected of them when we have time to put them in shape."

"By receiving the telegram in time we had saved our entrance fees certainly, but with telegram and letter we had lost what counts for a hundredfold more—the confidence of many friends," continued Mr. Swain. "The fact that the club intended challenging for the Vanderbilt Cup with our cars had been published broadcast, and there we were ignominiously thrown down at the last minute, by the one man upon whom we had placed every reliance, and in whom we had every confidence. Of course, we were sorry for Mr. Stanley's illness, but having committed himself so far, surely his own instinct of honor should have carried him through the project. We have written him since then, stating that to protect ourselves and our club something must be said for publication, and fully explaining our position in the disappointing affair, but have not been vouchsafed an answer. The motor public has now the whole matter before it, and we will leave it to judge the true merits of the case."

During the recital of the above facts Mr. Wilkins and Thomas W. Millett, Mayor of Cape May, who presided at the meeting of the Cape May club when the resolution of challenge was passed, were present, and both concurred in Mr. Swain's statements so far as they were personally concerned. With Mr. Swain, they were indignant at the treatment accorded them by the Stanley outfit, and motorists in general will be inclined to side with them.

J. HISCOCK,

Philadelphia.

Secretary Cape May Automobile Club.

ONLY TWO MERCEDES IN VANDERBILT RACE.

According to *Les Sports*, there will be only two Mercedes cars in the Vanderbilt Cup race, one owned and driven by Foxhall Keene, and the other owned by Robert Graves and driven by Jenatz. The third Mercedes entry is that of C. L. Charley, who is quoted in a cable to the New York *Herald* in this vein:

"The Mercedes house has definitely abandoned speed-racing, and I think that many competing firms will follow the same course. The value of the machine will be made apparent to the public by means of contests in which conditions are more analogous to those met with in ordinary touring."

The Charley entry for the Vanderbilt was to have been driven by Marriaux, and though nothing official has reached the Vanderbilt Cup Commission, it would appear that the Paris representative of the Mercedes did not intend to make good his entry.

BINGHAMTON A. C. WILL SEE CUP RACE.

First among the clubs to announce a run to New York to witness the Vanderbilt race is the Binghamton Automobile Club, of Binghamton, N. Y., which decided last week to start October 2 from that city on the trip. Incidentally, the run to the metropolis will be an endurance contest, and F. E. Barnes, Richard Davidge, Secretary Norman M. Pierce, M. J. Corbett and S. M. Frechie have been selected as a committee to conduct the run and arrange rules for the contest, the winner of which will be awarded a handsome cup donated by Mr. Barnes and Vice-president Faatz.

RACING OVER THE SAND AT ATLANTIC CITY

ATLANTIC CITY, N. J., Sept. 3.—After an unexpected shower had drenched the unprepared and unprotected spectators who journeyed this afternoon to Ventnor Beach, the sun broke forth and the third tournament of the Atlantic City Automobile Club began with well contested sport, the touring cars supplying some especially excellent finishes over the sandy stretch.

Interest centered in the touring car championship, which was won by A. W. Church's English Daimler, the pilot being the same Harding who drove it to victory in the Wilkesbarre climb. Ernest Kelly, with a Thomas, ran second in the final; a newcomer, an American Napier, being next across, and a Pierce Arrow completing the quartette that had been subtracted from the two trial heats.

By capturing the free-for-all for the second time, S. B. Stevens gained possession permanently of the Atlantic City \$500 Cup. Last spring his Vanderbilt Darracq had placed a mortgage on the cup, and to-day Campbell foreclosed it by taking both heats in succession. As on the former occasion, Charles Schroeder's Darracq was the runner-up, but though of the same horsepower it could not hold the lighter car. Howard Gill's Stanley steamer tried in the first heat, failed, and then withdrew. Tom Cooper, with a stripped Matheson touring car, made a plucky bid, but he was long on weight and a bit short on horsepower, when compared to the racing craft.

In the record trials the Stevens Darracq traveled the mile in :39 3-5, and the Schroeder Darracq was just a second slower. The Stanley was the solitary steam contender, and the Fiat, Jr., the only middleweight.

The Thomas Flyer had its innings in the price handicap, two of this make running first and second from scratch.

C. W. Kelsey's Maxwell took the \$3,000 and under class, a Buick landed the \$1,000 and under event, and the English Daimler triumphed over the Fiat in the foreign race.

In a practice whirl over the beach previous to the storm and the races, a Napier driven by Bates and carrying Manager Moody

as a passenger capsized through an abrupt turn that dislodged a forward wheel. Mr. Moody escaped with a sprained ankle and the driver with slight bruises.

After the storm had died away the crowd reassembled, gained substantially in numbers, and several thousands saw the completion of the first day's races of the three scheduled. Many women, clad in summery attire, were bedraggled beings, but they withstood the rain, and then Old Sol's rays partially restored their finery and good humor.

Following is the first day's summary:

ONE-MILE TOURING CAR CHAMPIONSHIP, 60 H.P. OR LESS.

1. English Daimler, 60 h.p.; owner, A. W. Church; driver, Harding 1:08 4-5
2. Thomas, 50 h.p.; driver, Ernest R. Kelly 1:11 4-5
3. American Napier, 60 h.p.; owner, Alfred Codman; driver, Wellington.
4. Pierce Arrow, 45 h.p.; owner, E. R. Strong; driver, Coles.

ONE-MILE FREE-FOR-ALL CHAMPIONSHIP, FLYING START.

1. Darracq, 80 h.p.; owner, S. B. Stevens; driver, Campbell.. 1 1
 2. Darracq, 80 h.p.; owner, C. A. Schroeder; driver, Wallace..... 2 2
 3. Stanley, 20 h.p.; owner and driver, Howard Gill..... 3 dr
- Time—First heat, :46 4-5; second car, :50 3-5. Second heat, :45 2-5; second car, :51 4-5.

ONE-MILE PRICE HANDICAP FOR FOUR-CYLINDER TOURING CARS.

1. Thomas, 50 h.p.; driver Ernest R. Kelly; scratch..... 1:21 3-5
2. Thomas, 50 h. p.; driver, W. T. Smith; scratch..... 1:29 3-5
3. Mitchell, 30 h.p.; driver, H. R. Sack; 11s.
4. Maxwell, 35 h.p.; driver, C. W. Kelsey; 5s.

ONE MILE, TOURING CARS SELLING AT \$3,000 OR LESS.

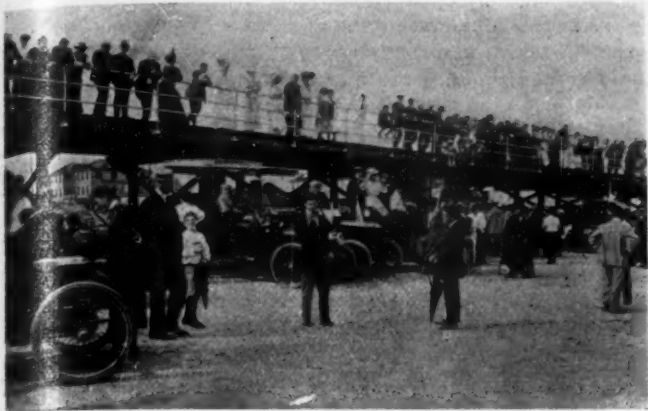
1. Maxwell, 35 h.p.; owner and driver, C. W. Kelsey..... 1:30 3-5
2. Mitchell, 30 h.p.; owner and driver, H. R. Sack..... 1:33 4-5
3. Locomobile, 20 h.p.; owner and driver, D. Roy Fowler.

ONE MILE, OPEN TO ALL FOREIGN CARS.

1. English Daimler, 60 h.p.; owner A. W. Church; driver, Harding 1:10 4-5
2. Fiat, 35 h.p.; owner, Hol-Tan Co.; driver, Cedrino.... 1:11 2-5



GENERAL VIEW OF THE VENTNOR BEACH COURSE AT ATLANTIC CITY ON MONDAY MORNING PRIOR TO THE RACES.



SPECTATORS WITNESSING STARTS FROM BOARD WALK.

ONE MILE, RUNABOUTS SELLING AT \$1,000 OR LESS.

1. Buick, 22 h.p.; owner, Keystone Motor Car Co.; driver, Eddie Wilkie 1:34 4-5
2. Maxwell, 10 h.p.; W. M. Davis.
3. Maxwell, 10 h.p.; J. D. Maxwell.

ONE-MILE RECORD TRIALS.

1. Darracq, 80 h.p.; owner, S. B. Stevens; driver, Campbell :39 3-5
2. Darracq, 80 h.p.; owner, C. A. Schroeder; driver, Wallace :40 3-5
3. Stanley, 20 h.p.; owner and driver, Howard Gill :51 2-5
4. Fiat, Jr., 24 h.p.; owner, Hol-Tan Co.; driver, Cedrino.. :51 4-5

THE STORY OF THE SECOND DAY.

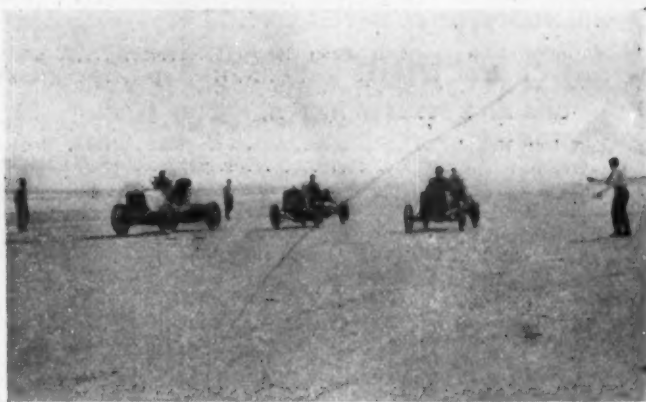
ATLANTIC CITY, N. J., September 4.—Match events were the feature contests of the second day, and some money changed hands when the Matheson, driven by Tom Cooper, defeated by less than a second the English Daimler, again handled by Harding, which had on the previous day won the open touring car championship. It was known that the American car figured closely in speed with its foreign rival, and interest was general when it became known that the pair were to meet in a special mile struggle.

There isn't much to tell about a mile race. The Daimler drew the pole, got away in the lead by the better part of a yard, but the Matheson seemed to have a bit in reserve. Cooper soon utilized that bit, drew alongside, then passed Harding, gradually increasing the advantage as the mile wore on. Timer Boyle's automatic gave 58 1-5 seconds for the distance, and three-fifths of a second behind came the beaten car, in the direction of which the victorious driver could not resist the temptation to cast a look that betrayed extreme exuberancy. President C. A. Singer, of the Matheson Company, was an elated observer of the victory.

The six-cylinder American Napier took on the Fiat from Italy, and again the honors went to the stars and stripes, the Fiat not even finishing the mile.



WINNING THOMAS CAR ON LEFT AT START OF PRICE HANDICAP.



S. B. STEVENS' DARRACQ WINNING ATLANTIC CITY CUP.

To-day's success and interest in the match races may cause Manager W. J. Morgan, who was a spectator, to advise the Florida East Coast Automobile Association to set aside one day of next winter's meet for special contests.

In the regular events the Thomas scored in the \$5,000 touring car class, with the Packard at its heels, and the Pierce running third.

The Schroeder Darracq scored over the Stevens Darracq in the standing start championship for the free-for-allers, but the result was more so the other way, when the same two contested the four-cylinder race. In the time trials the 1905 Vanderbilt winner again displayed superior speed.

The summary of the afternoon:

ONE MILE FOR TOURING CARS \$5,000 OR LESS.

1. Thomas, 50 h.p.; owner and driver, E. R. Kelly 1:14 3-5
2. Packard, 24 h.p.; driver, Ernest Lash 1:14 4-5
3. Pierce, 45 h.p.; owner, E. R. Strong; driver, Colea.

ONE MILE FREE-FOR-ALL, STANDING START.

1. Darracq, 80 h.p.; owner, C. A. Schroeder; driver, Wallace. :58 1-5
2. Darracq, 80 h.p.; owner, S. B. Stevens; driver, Campbell.. :58 2-5
3. Matheson, 50 h.p.; owner, Matheson Company; driver, Tom Cooper.

ONE-MILE FOUR-CYLINDER CHAMPIONSHIP.

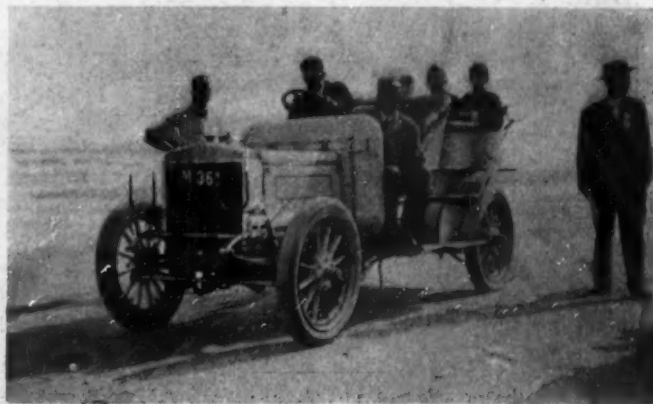
1. Darracq, 80 h.p.; owner, S. B. Stevens; driver, Campbell.. :50
2. Darracq, 80 h.p.; owner, C. A. Schroeder; driver, Wallace. :57 4-5

ONE MILE, AMERICAN TOURING CARS, 30 H.P. OR LESS.

1. Packard, 24 h.p.; driver, Ernest Lash 1:15 4-5
2. Franklin, 30 h.p.; driver, Samuel W. Moore 1:22
3. Peerless, 30 h.p.; driver, G. J. Patterson.
4. Peerless, 24 h.p.; driver, Barney Oldfield.

TOURING CARS SELLING AT \$1,500 OR LESS.

1. Stanley, 10 h.p.; driver, D. W. Harper 1:42
2. Buick, 22 h.p.; driver, E. Wilkie 1:42 1-5
3. Maxwell, 20 h.p.; driver, John W. Davis.
4. Maxwell, 20 h.p.; driver, W. C. Longstreth.



HARDING AND ENGLISH DAIMLER, CHAMPIONSHIP WINNER.

ONE-MILE SPECIAL MATCH, MATHESON vs. DAIMLER.

1. Matheson, 50 h.p.; driver, Leon Cooper..... :58 1-5
2. English Daimler, 45 h.p.; driver, H. N. Harding..... :58 4-5

ONE-MILE SPECIAL MATCH, NAPIER vs. FIAT.

1. American Napier, 60 h.p.; owner, Alfred Codman; driver, Wellington 1:04 4-5
2. Fiat, 35 h.p.; owner, Hol-Tan Co.; driver, Cedrino.



START OF \$3,000 CLASS, WON BY KELSEY, IN MAXWELL.

ONE-MILE TIME TRIALS.

- | | |
|---|----------|
| Darracq, 80 h.p.; owner, S. B. Stevens; driver, Campbell.... | :39 3-5 |
| Darracq, 80 h.p.; owner, C. A. Schroeder; driver, Wallace.... | :41 4-5 |
| Fiat, Jr., 24 h.p.; owner, Hol-Tan Co.; driver, Cedrino..... | 1:05 2-5 |
| Stanley, 20 h.p.; driver, D. W. Harper..... | 1:07 |
| Pierce, 45 h.p.; owner, F. R. Strong; driver, Coles..... | 1:09 2-5 |
| Franklin, 30 h.p.; driver, S. W. Moore..... | 1:14 1-5 |

ONE MILE FOR STEAM CARS.

1. Stanley, 10 h.p.; owner and driver, Morrill Dobbins..... 1:25 1-5
2. Stanley, 10 h.p.; owner and driver, J. T. Moriarity..... 1:32 2-5

FLOTSAM AND JETSAM OF THE TIDE.

Alfred Reeves, the A. M. C. M. A. manager, was an observing onlooker, whom nothing escaped. He is ever ready to talk about the December show in the Grand Central Palace, New York City, the early dates for which satisfy many.

President W. E. Edge and Chairman H. B. Cook carried the burden of the race meet, their previous experience having fitted them thoroughly for the task. Help when desired was forth-



CROWDING THE BEACH AFTER THE DAY'S EVENTS.

coming, however, from the membership of the Atlantic City Automobile Club, which is one of the liveliest organizations in New Jersey.

Barney Oldfield, the Peerless track king, was more or less in evidence, accompanied by E. C. Bald, who recently has been prominent in circular course competition. The two ex-cyclers are

to be figures in the race scene of a No. 2 "Vanderbilt Cup" company, which is now rehearsing for a road tour. On Tuesday Oldfield drove his touring car in an event to please the club members. He did not expect to win, nor did he.

Among the well-known trade representatives present were C. A. Singer, president of the Matheson Motor Car Company; F. P. Brand, sales manager of the Autocar Company; C. W. Church, of Wyckoff, Church & Partridge, New York; R. H. Johnston, advertising manager of the White automobile interests, which supplied an appreciated car for the press; Edward Robertson, of the Hartford-Truffault Suspension; G. M. McWilliams, manager of the American Darracq Company; F. F. Goodman, of the Graygood Shock Absorber; Louis Ross, of Ross steamer fame; E. A. Lozier, of the Lozier Motor Car Co.

MAYOR BECKER AFTER A RECORD.

Mayor Sherburn M. Becker of Milwaukee is an automobilist of the red-hot enthusiastic type, and he recently made a dash from Chicago to New York in sixty hours, driving his 40-horsepower Pope-Toledo. So little difficulty was experienced in making this fast run that the mayor became fired with record-breaking ambitions, and determined to make an attempt on the home journey to break his own record of sixty hours, and also the best



MAYOR BECKER STARTING FOR HIS RECORD RUN.

record for the trip, 58 hours and 53 minutes, if he could. Starting Monday morning, September 3, from Broadway and Fifty-eighth street, New York, the mayor and five other men, including the chauffeur, were prepared to stick to the car right through, stopping only for the bare necessities of life.

But the mayor's ambitions received a rude shock when, no further away than Newburgh, N. Y., the car struck a stone in the road and skidded into the ditch, landing the whole party in the mud and badly damaging the car. The occupants were all hurt, but only slightly. A mechanic was at once wired for and a delay of seven hours was caused in making repairs. The trip was resumed, however, and the effort to make a record continued, notwithstanding the heavy handicap. The car got away again at 5:30 P.M.

WASHINGTON TO HAVE TWO NEW GARAGES.

WASHINGTON, D. C., September 3.—Two old residences on New York avenue are being torn down, and in their place will be erected two modern garages, one of which will be occupied by the Commercial Automobile & Supply Co., Wayne & Logan, agents, and the other by the Motor Car Co., local representatives of the Peerless and Stevens-Duryea. The Commercial Company will be located at 1313 New York avenue, and the Motor Car Co. at 1315.

PLAIN STORY OF AN INTERNAL COMBUSTION MOTOR

By LOUIS J. BUSCHMAN.

EVERY owner or prospective purchaser of an automobile should be familiar with the basic principles that enter into the construction and operation of the motor; first, because a clear understanding of these things render operation a much easier proposition, and, second, because successful operation cannot be accomplished without acquiring a general knowledge of the reasons which impel its action. Some historical data also, while it may not prove of special practical value to the operator, is of great interest, inasmuch as it records successive stages in the development of a great industry. It is advisable to study and find out how things are, and how they should be, and then one will be prepared for any emergency that may arise. Learn the why and wherefore of the different operations and prevent trouble, rather than have to remedy it after it occurs.

The internal combustion engine is so called because the burning or combustion of the fuel takes place in the engine itself; not as in the steam engine, where the combustion takes place under the boiler and the rest of the operations in the engine. The engine takes its name from the fuel used, as gas, gasoline, or coal-oil engine. As the general principles are the same, the term gas engine will be used to include all engines.

The first engine of this type was built as early as 1678, in which gunpowder was used as fuel, but the explosions were irregular, and of unequal force, and nothing practical was accomplished. When in 1792 Murdock, a Cornishman, first practically distilled gas from coal, the gas engine was again attempted, and many engines built, but the steam engine held the interest of the majority of engineers, as it seemed to offer the best field. Many experiments were made, but the engines would not stand up to a practical test, and not much of real value was gained until in 1862 Beau de Rochas, a Frenchman, who had studied the subject theoretically, patented the four propositions by which later Dr. Otto built the first successful gas engine operated in any country.

Distillation of Petroleum as a Fuel.

With few exceptions, automobile engines use some product of crude petroleum as fuel. The crude petroleum is placed in stills and heat applied by means of coal-fire underneath. This distillation is repeated in similar stills or in stills heated by steam, until the various products are obtained. After each distillation the gases pass through a condenser, which consists of a long coil of pipe immersed in a tank of running water. Here the gases are condensed and are divided into two divisions, namely, the naphthas of gasoline, and the oils or coal-oils. The residue from the first still is used in making lubrication oils, candles, wax, paraffine, and the final product is the petroleum coke.

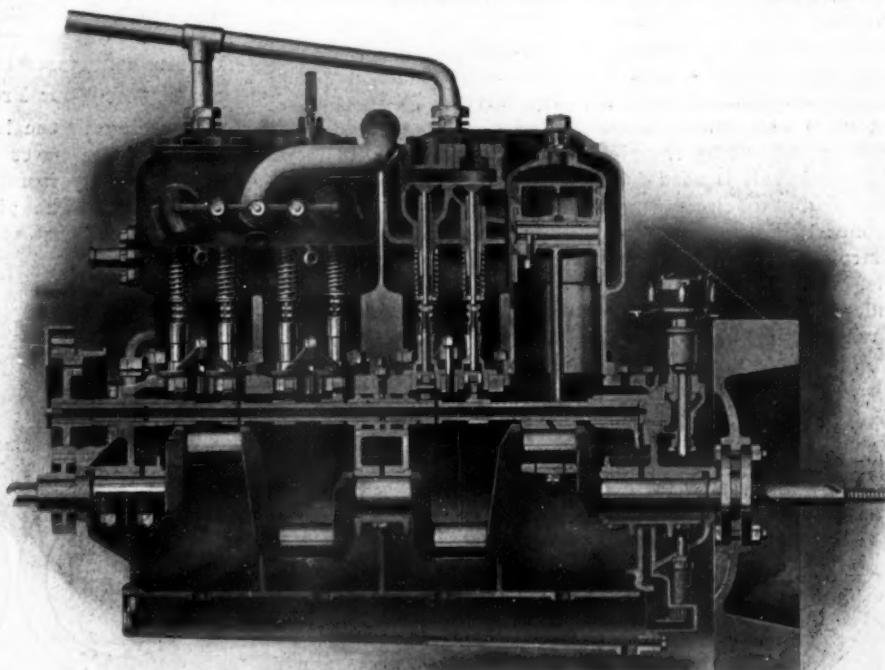
Gasolines are graded according to their specific gravities, and the coal-oils according to their flashing point. The specific gravity of a liquid is the ratio of the weight of

liquid to the weight of an equal volume of pure water at some standard temperature. It is known by the symbol S. G. The S. G. of a liquid is found by means of an instrument called an hydrometer. An hydrometer consists of three parts, the upper portion being a long, graduated tube; these graduations may read direct in specific gravity, or to some arbitrary scale. The center portion is a long bulb, and the lower portion is a round bulb weighted with shot to keep the instrument upright in the liquid. Gasoline in this country is graded according to Baume's scale, which is an arbitrary one. To find the S. G. from the Baume reading the following formula is used:

Let B represent the Baume reading.

$$S. G. = \frac{140}{130 + B.}$$

The S. G. of 68 gasoline is found by substituting 68 in place of B and reducing the fraction. The flashing point of coal-oil



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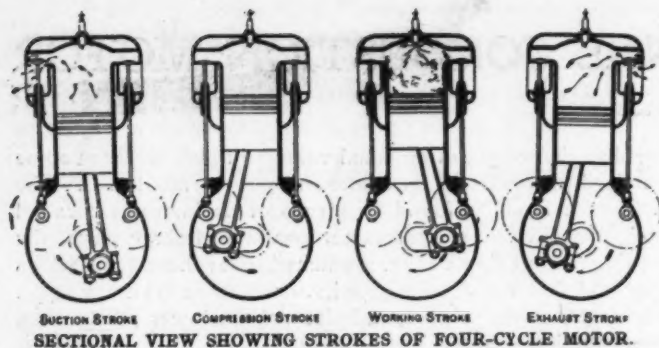
FOUR-CYLINDER FOUR-CYCLE VERTICAL MOTOR, PARTLY IN SECTION

is the temperature to which the oil must be heated so that the gas given off is ignited by a flame passed over it.

Functions of the Piston and Its Operations.

The cylinder is the chamber in which the operations of an engine take place. The cylinder of a gas engine is open on one end, the other being closed by the cylinder-head; this may be cast solid with the cylinder or be bolted to it. The piston is the moving part of the engine, against which the pressure of the burning gases is exerted. As the piston is thinner than the cylinder, it will expand faster than the cylinder, and if it fits tight enough to hold the pressure on starting when the engine is cold, it will bind as the engine heats when running. To overcome this difficulty grooves are cut in the upper end of the piston, and in these are fitted thin narrow rings, which press outward against the cylinder and keep the pressure of the burning gases from escaping. These are known as piston-rings.

In the cylinder are two openings, one which admits a mix-



ture of gas and the air, and the other which the burnt gases are expelled. The first is called the inlet, and the second the exhaust. These openings are closed by means of valves, usually of a form known as poppet-valve. This is a flat disc with tapering sides, which rests when the valve is closed on the valve-seat. A valve is opened by atmospheric pressure, or some mechanical means, and is closed by a spring. The valve stem is a rod, either made solid with the valve or screwed or riveted to it, and serves as a guide for the valve, so that it tightly closes the opening. The spring mentioned above surrounds this stem.

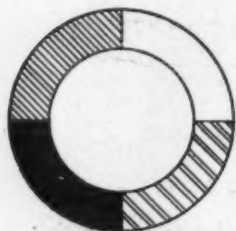
When a valve is mechanically operated, it is lifted from its seat by means of a cam, which has an irregular shape, so as to give intermittent motion to the valve.

A port is an opening in the side of the cylinder, which is opened and closed by the piston as it moves back and forth.

The crankshaft is used to change the reciprocating motion of the piston to circular motion. A connecting rod forms the connection between the piston and the crankshaft.

A stroke is one of a series of alternating continuous movements, as the movements of the piston from one end of the cylinder to the other.

It will be shown later that only one of the strokes of the series is a working stroke; that is, the engine is doing work. The rest of the time work must be done upon the engine; therefore, it is necessary to store up sufficient energy so that the engine may have continuous steady motion. This is accomplished by fastening a heavy weight, called the fly-wheel, to the crankshaft, and this being set in motion during the working stroke carries the engine over the idle strokes.



SUCTON STROKE
 COMPRESSION STROKE
 WORKING STROKE
 EXHAUST STROKE

DIAGRAM ILLUSTRATING THE FOUR STROKES.

In order to fix the succession of changes thoroughly in the reader's mind, note that once around the circle brings one back to the starting point. The first quarter represents the suction stroke; the second, the compression stroke; the third, the working stroke; the fourth, the exhaust stroke.

if the temperature remains the same. For example, if we take 4 cubic feet of gas at 15 pounds pressure, and force it into a cylinder whose cubical contents or volume is 2 cubic feet, the pressure will rise to 30 pounds; this is called compressing a gas. If we force it into a cylinder whose volume is 8 cubic feet the pressure will fall to $7\frac{1}{2}$ pounds; this is called expanding a gas.

By experiment we find that when a gas is compressed the temperature rises, and if this heat is not gotten rid of the pressure rises more rapidly. Conversely, when the gas expands the temperature falls, and if no heat be added the

pressure will fall more rapidly. If a gas is heated it will rise in volume 1-492 of its volume for every degree Fahrenheit, rise from or at 72 degrees Fahrenheit if the pressure remains the same; that is, if the gas can expand freely.

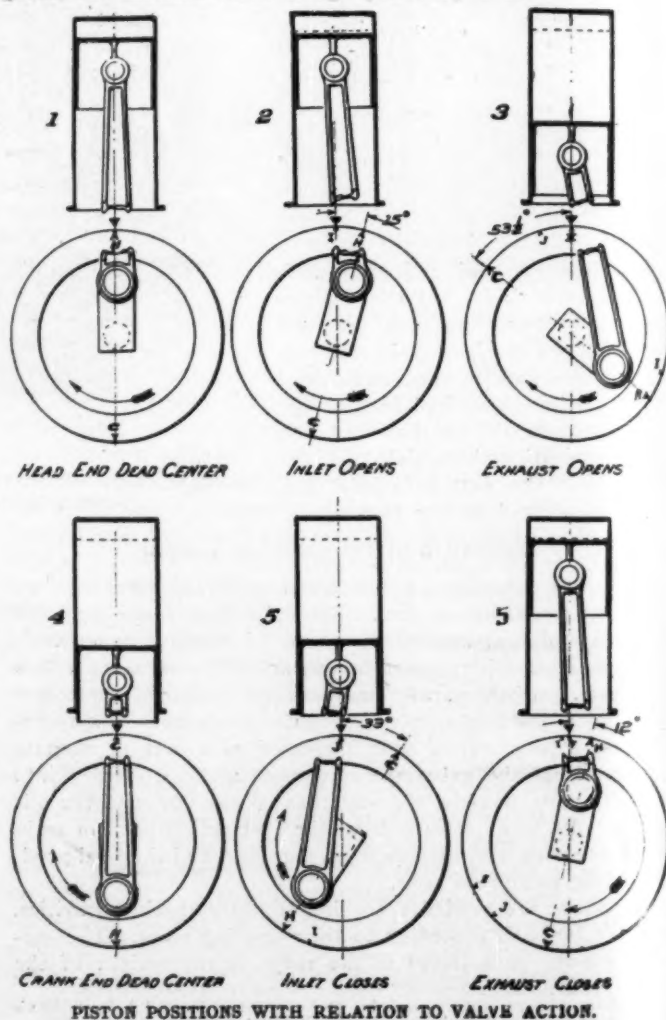
In a gas engine the volume, pressure, and temperature all vary, so that a combination of the above laws holds true, although the designer is largely governed by practical experience and experiment.

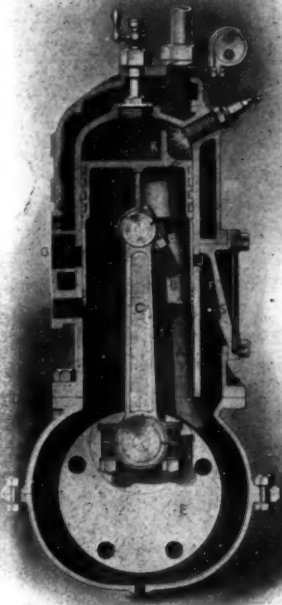
Classes of Gas Engines as Designated by Cycles.

There are two general classes of gas engines—two and four-cycle. This should be two or four-stroke cycle, as it takes that many strokes to complete the cycle of operations. We shall first take up the four-cylinder engine, as it is the one most generally used in the automobile. As the piston moves away from the head of the cylinder, where the cubical contents of the cylinder is the smallest, it increases this volume; therefore, the pressure falls, and when it falls below that of the atmosphere a vacuum is formed and the inlet valve is forced open, and the inrushing air, carrying with it a sufficient amount of gas line to form an explosive mixture, fills the cylinder. As the piston starts back the spring on the inlet valve closes it and the mixture is held in the cylinder. The piston moves toward the head, and decreases the volume within the cylinder, and the pressure increases to what is known as the compression pressure. If now the mixture is ignited the gases increase temperature and volume.

The Four Propositions of Beau de Rochas.

According to the laws mentioned before, the pressure of the expanding gases will exert a force against the piston, driving it away from the head end of the cylinder and thus doing work. The piston, returning, drives out the burnt gases, the exhaust valve being opened by a cam.





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ONE-CYLINDER, TWO-CYCLE MOTOR.

Showing working parts at the moment of ignition of charge.

These, in brief, are the operations taking place within the cylinder of the gas engine, and a discussion of these operations follows. First will be taken up a discussion of four propositions of Beau de Rochas. They are as follows:

1. Largest cylinder volume with least surface.
2. Highest possible piston speed.
3. Maximum expansion.
4. Maximum pressure at beginning of expansion.

We should have as large a volume as possible, with as small exposed surface so as to keep the heat from escaping through the cylinder and be lost in the cooling water. The reason for high piston speed is the same, although there are practical reasons which limit this. The gases should be expanded as far as possible, in order to get all the power that can practically be obtained. The higher the pressure before ignition, the higher will be the pressure afterwards available for work. The practical limit here is the point where the gases will ignite from the high temperature due to this high compression.

Properties and Operations of the Valves.

Valves are timed to open and close at different points during the piston travel, the exact point where the ignition of the mixture should begin for the different speeds of the engine.

The inlet-valve is sometimes mechanically operated, that is, instead of being opened by the atmospheric pressure behind, it is opened the same as the exhaust valve by means of lever mechanism moved by a cam. Those who use the mechanically operated valve claim that the opening is more positive and that more mixture can be drawn into the cylinder. A stronger spring on the valve can be used than with the first-mentioned inlet-valve or suction-valve, as it is sometimes called, because with too strong a spring on a suction-valve it will not open quick enough to admit sufficient charge, and with too weak a spring the valve may not seat properly and

part of the mixture be lost during compression. A suction-valve closes as soon as the pressure within the cylinder becomes the same as the atmosphere. The mechanically operated valve may be held open until the momentum of the incoming column of mixture is overcome by the returning piston. This insures more mixture in the cylinder. This must

be said in favor of the suction-valve, that we do away with all the parts necessary to operate the other, and the fewer the parts the less there is to get out of order.

The exhaust valve should open just enough before the end of the stroke to relieve the pressure against the piston in its returning stroke, because this means work done on the engine and reduces the amount of power the engine has available for work. If it opens too soon, too much pressure is lost and not so much power is obtained from the mixture.

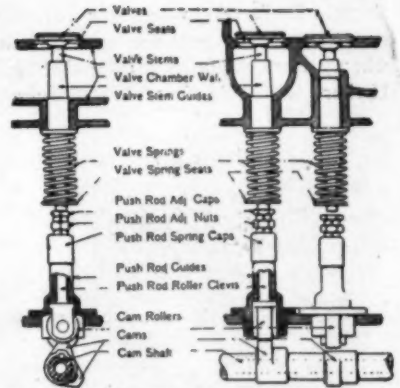
The exhaust valve should close as soon as the piston reaches the end of the stroke. If it closes before this, more of the burnt gases will be held in the cylinder, keeping out the fresh mixture on the next stroke. If it closes later than this the vacuum will be longer in forming and less mixture will be forced in.

Some Pertinent Suggestions for the Owner.

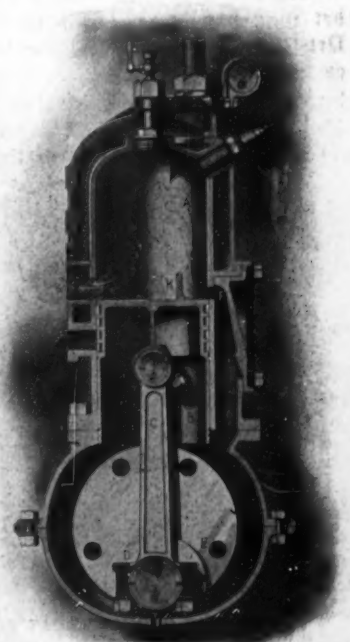
The average owner of a car, particularly one who possesses some little mechanical knowledge, is apt to try out every new idea he hears or reads about. Let him remember this, that the chances are good that this very idea has been tried by the manufacturers and not proven entirely satisfactorily, and he must also remember that this experimenting costs money.

In a business as new as this there are many improvements being put on the market all the time. The changing of one part will often affect the entire engine in a way that will puzzle anyone not perfectly familiar with a gas engine, and if any one wants to try any of these new ideas it would be well for him to consider first the effect on the engine as a whole.

The same holds true with an engine which is not working right, as with one on which some experimenting is being done. Always try one thing at a time. Learn in the first place just how the different adjustments have been made at the factory, and then keep everything in

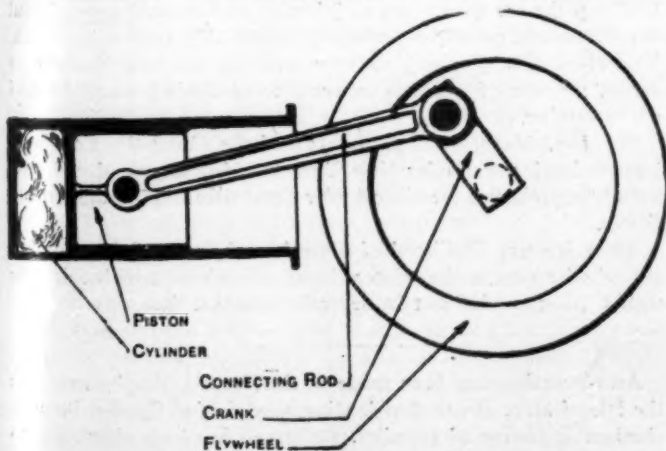


DETAILS OF MECHANICALLY OPERATED VALVES.



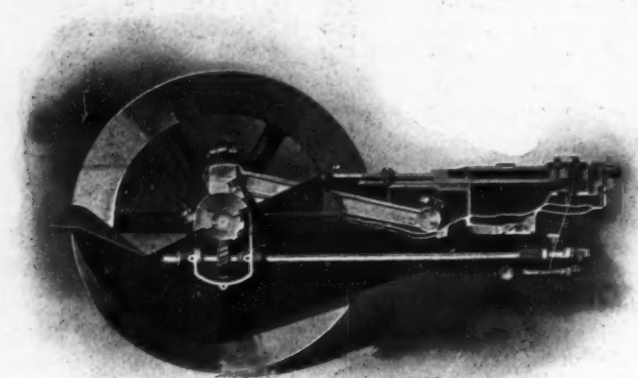
Copyright, 1906, by F. A. Faurote.
THE TWO-CYCLE MOTOR.

Showing working parts at time of inlet and exhaust.



SIMPLIFIED DIAGRAM OF WORKING PARTS OF MOTOR.

shape. Don't try to see how the wheels go round as does the small boy, unless you are sure that there will be none left over when you try to put things together again. Let well enough alone. If there is trouble, first see that everything is adjusted as it was



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HORIZONTAL FOUR-CYCLE MOTOR, PARTLY IN SECTION.

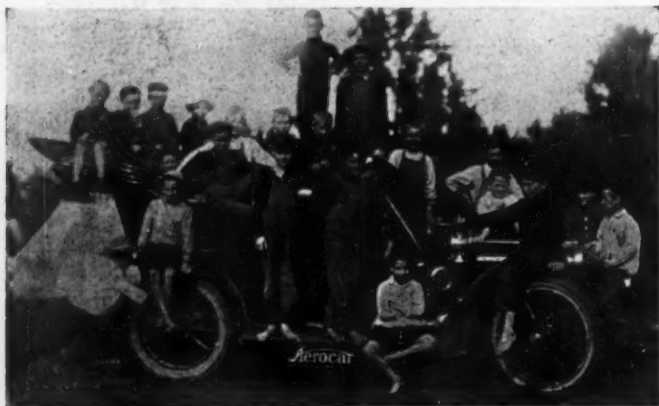
at the start. Never try to adjust a new machine; make the agent do that and save yourself future trouble. Sometimes parts get out of adjustment during shipment. As soon as an owner receives a car it would be well for him to go over it thoroughly, and see for himself just what shape it is in, but do not move any screws or bolts or take anything apart. If it becomes necessary later on, mark each part as you remove it.

100-MILE ROAD RACE FOR JOPLIN, MO.

Sanction has been asked for a 100-mile race, to be run on a 25-mile circuit out of Joplin, Mo., on September 26. To give all cars a chance and thereby secure a greater number of entries, the cars will be handicapped, under the direction of A. C. Webb. The county authorities have offered to permit the race and suspend the speed limit on the day of the race.

FRESH AIR CAMPERS HAVE AN OUTING.

"Gee, it was great!" Not a particularly elegant expression, but it adequately expressed the feelings of the twenty-three Detroit youngsters who had just been for an airing in an Aerocar and whose photograph is reproduced here. The lads had been having the time of their lives at a "Fresh Air Camp" provided by kindly disposed Detroiters, and the climax of delight was attained when the Aerocar Company of that place sent out



DETROIT ORPHANS THAT RODE IN AN AEROCAR.

one of its cars and, packing the whole twenty-three on board as only youngsters can pack into an automobile, whirled through Oakland county and brought the crew back to the camp fairly breathless with the pleasure of the novel treat.

DETACHABLE RIMS IN FRANCE.

PARIS, August 31.—The one question occupying automobile Paris at the present moment is whether detachable rims shall be employed for touring. Among manufacturers of this new appliance there is discussion on another point, each one accusing the other of infringing his patents. In the Grand Prix race there were three different kinds of detachable rims, alike in principle, but differing in detail. The M. L. and the Vinet, which have already been fully described in THE AUTOMOBILE, were the first to be put on the market. The Vinet is held in position by a broken steel circle forming a wedge, fitting onto bolts imbedded in the wooden rim and held there by nuts. The M. L. has a number of lugs riveted to the detachable rim, each one with a hole through which passes the end of a bolt imbedded in the wooden rim. The Michelin people have adopted as a form of attachment eight separate steel wedges fitting on the end of eight bolts passing through the wooden rim and held by a nut. The wedges prevent both side movement and creeping on the fixed rim. No Michelin rims have yet been offered to the public, and although those at present in use have given good results in three important races, the firm is at work on an improved model which may be expected out shortly.

For racing purposes no one questions the utility of detachable rims, their value being so thoroughly proved in the Grand Prix, the Ardennes, and the Liederkerke Cup, a speed contest for touring machines. As to their value for all-round touring, there are two opinions: M. Brasier, the eminent engineer, declares detachable rims useless to those who use automobiles for pleasure or business. Inflated tires left unused lose their elasticity and rapidly deteriorate. The use of detachable rims, too, according to the head of the Brasier firm, will not encourage tire manufacturers to turn out better goods. M. Vacherot, director of the Darracq factory, is entirely of the opposite opinion, and predicts as great a success for detachable rims on touring machines as they have already had on racers. M. C. L. Charley, of the Mercedes firm, although he has just taken out a patent for rims, has not much faith in their being adopted extensively for touring. M. Price, of the Dunlop house, and M. Loeser, of the Continental firm, are both of opinion that it is too early to pass a definite opinion. They consider the means of attaching the rims too weak, and point out that the two surfaces are liable to rust, making the last state of the motorist worse than the first.

The cost of changing fixed rims into mobile rims is, in Paris, from \$20 to \$30 per wheel, according to sizes. Up to the present very few automobilists have had the change made, most of the cars seen with the new system being either racers or demonstration machines.

NEW SIX-CYLINDER HOTCHKISS.

PARIS, August 23.—The first six-cylinder car constructed by the Hotchkiss firm left Paris this morning for New York. In the trial trip the car gave every satisfaction and showed a wonderful suppleness and power of picking up on the high gear in hill work. The Hotchkiss Company is now building six-cylinder cars in series, the first of which is expected to be ready toward the end of September.

Mr. J. J. Mann, general manager of the Hotchkiss Company, intends leaving Paris for New York in a few days and will personally superintend the six-cylinder demonstrations in the United States.

There is every likelihood of a number of French firms showing six-cylinder cars at the winter shows, experiments with this new model being carried out in several important factories.

An alteration has been made in the Tourist Trophy route on the Isle of Man. Instead of leading over the full Gordon Bennett eliminating course of 52 miles, the circuit has been shortened to 40 miles, thereby avoiding five level crossings.

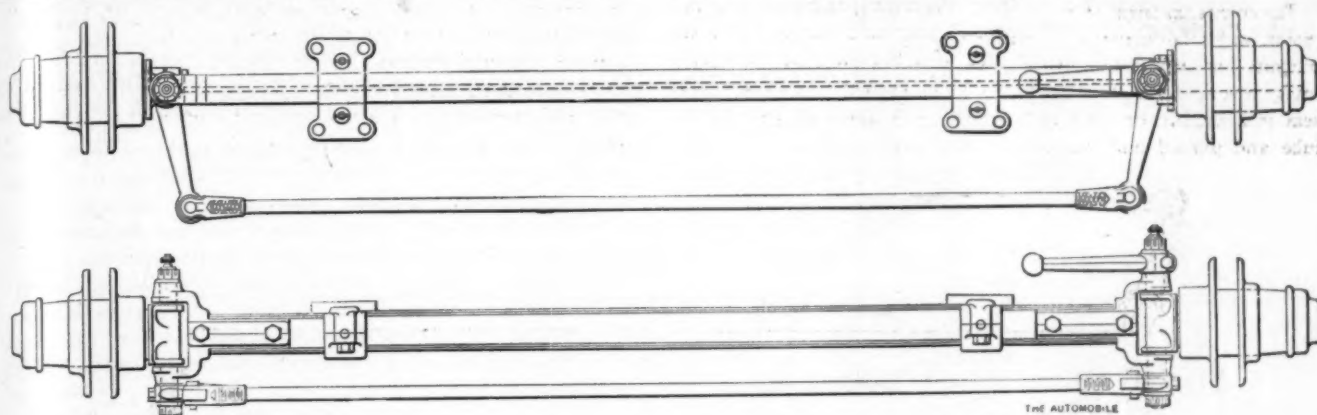
AUTOMOBILE FRONT AXLE CONSTRUCTION

AUTOMOBILE front axles involve problems which do not enter into the design of front axles for horse-drawn vehicles, and are therefore different in many respects. In the horse-drawn vehicle the motive power itself—the horse—furnishes the energy which moves the steering wheels, and the horse is so placed that this method of steering is the most natural and convenient. In the automobile, however, the motive power is not in any way connected with the steering gear, and the driver's strength must be sufficient to deflect the front wheels easily and promptly. In the usual type of automobile the energy required to swing an axle of the horse-drawn vehicle type, with fifth wheel, would be excessive, and if geared down so as to require little exertion the movement would be too slow for practical work.

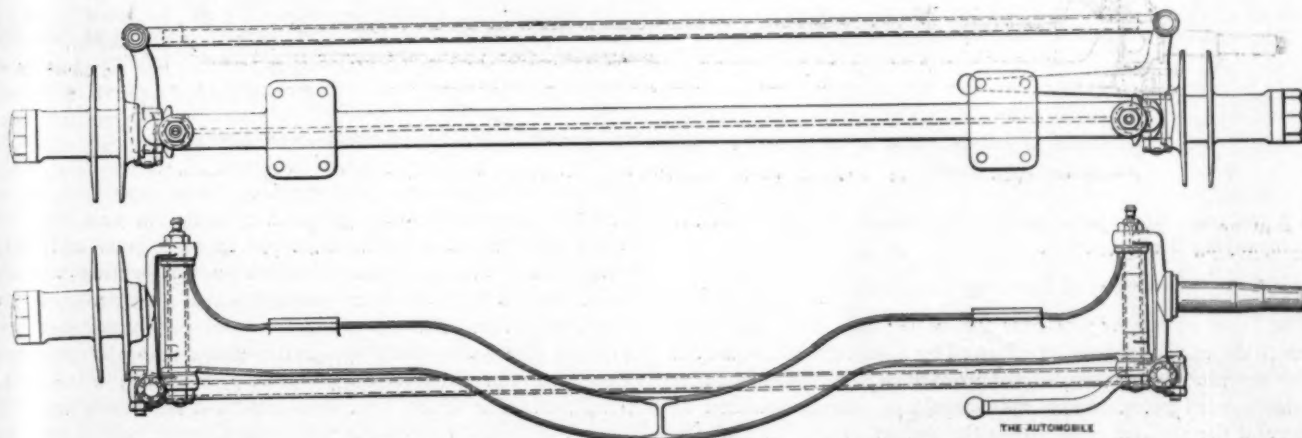
gether, and the course of the car will be changed as the wheels are deflected in either direction. The steering gear is so connected as to produce the lateral movement of the rod and steering arms by turning the hand wheel or swinging the lever, as the case may be. The complete joint, including the fork, pivot and all the component parts, is usually called the "knuckle," or "steering knuckle."

Details of Front Axles.

Coming down to details, the axle proper—usually referred to as the axle—is most frequently made either of heavy steel tubing or of steel of what is called I-beam section—that is, the cross-sectional shape resembles a letter I with the little horizontal



STRAIGHT I-BEAM FRONT AXLE WITH ELLIOTT STEERING KNUCKLES AND SPRING SEATS BOLTED ON.



DROPPED FRONT AXLE OF I-BEAM SECTION WITH REVERSED ELLIOTT KNUCKLES AND INTEGRAL SPRING SEATS.

Moreover, the effects of road shocks upon the steering gear would be multiplied by the leverage afforded by the distance between the wheel and the steering gear. Therefore the automobile steering axle is usually of another type, though a few cars of light weight have been designed with modified fifth-wheel steering axles. These are very seldom seen, however.

Essentially, the front axle of an automobile consists of three parts: the axle proper, fixed at right angles to the frame of the car, and two short stubs at the axle ends, upon which the wheels turn, pivoted to the axle so as to be movable in a horizontal plane about the axes of their pivots. These stubs are as short as practical considerations will permit. From each stub projects an arm in a horizontal, or nearly horizontal, plane, and these two arms are connected by a cross rod jointed to each arm. It will be understood that if the connecting rod is moved from side to side the stubs and the wheels mounted upon them will be moved to-

lines at top and bottom exaggerated. The vertical part is called the web of the I-beam and the horizontal parts the flanges. There are also many axles made of solid steel of square or other rectangular shapes, of oval steel, or other forms; the tubular and I-beam axles are those most widely used, however. In some cases front axles are made straight from end to end; more commonly the axle is bent in a vertical plane—dropped—to make room for the crankcase of the engine. This dropping is carried out in a variety of ways: sometimes the axle forms a continuous arc from end to end; sometimes there is a sharp offset near each end and the middle part is straight; sometimes there is a downward sweep near the center of the axle while the outer sections are straight, and sometimes there is a combination of bends near the ends and in the middle. Probably the most familiar type is the axle dropped in the middle, under the engine, and straight near the ends, where the spring seats are attached.

Different Manufacturing Methods.

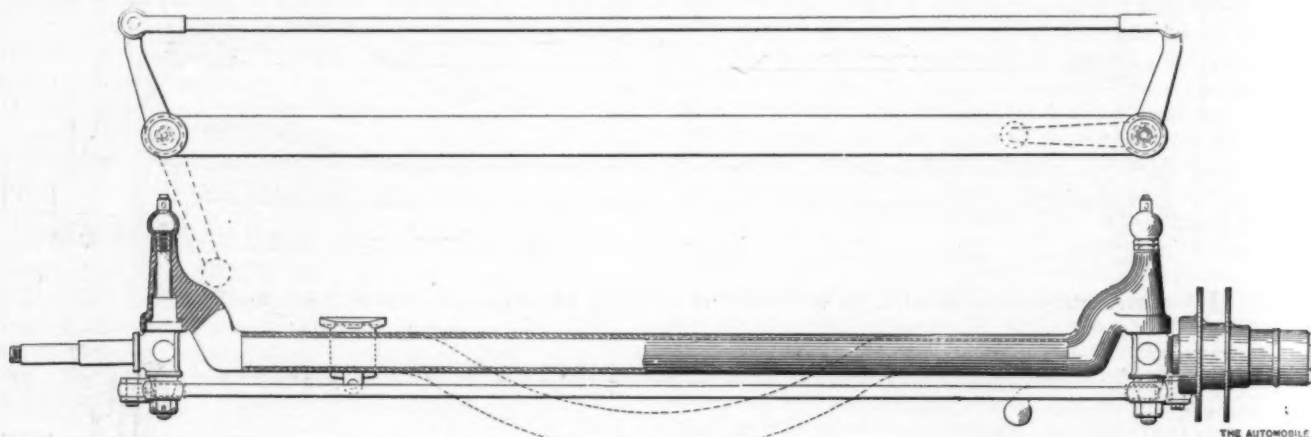
Manufacturing methods also differ greatly. In the case of I-beam axles the axle is, in a few cases, more especially in racing cars, forged first from a solid bar to the requisite contour and then the channels are machined out, giving the I-beam section. This is of course a very expensive construction and is not usually considered necessary. Frequently the pivots, or else the bearings for the pivots, are forged integral with the axles. When this is the case it is not uncommon for the axle to be made in two halves and the two welded together in the middle. Again, the pivot ends may be welded to the body of the axle, or, occasionally, mechanically fastened. In the case of the tubular axle the knuckle parts are usually separate forgings machined to fit tightly into or over the ends of the axle tube and pinned and brazed into position.

The front springs of the car rest on the front axle, and provision must be made for securing them in position. For this purpose "spring seats," or "perches," are attached to or formed integral with the axle. In the case of a tubular axle the spring seat is a casting or forging bored to fit closely around the axle tube and pinned and brazed; or else it is made in two halves,

cross-piece on the stub, and may project either to the front or rear. Occasionally there are two such arms, one projecting forward and the other backward, each pair connected by its connecting rod. This is the Elliott knuckle in its simplest form. The reversed Elliott knuckle has the fork on the stub and the cross-piece on the axle proper; the arm is, of course, always on the stub or swiveling part of the knuckle.

There are many variations in the methods of working out the details of these knuckles. Instead of using a through bolt as a pivot, the cross-piece itself may be arranged to turn in bearings screwed into the jaws of the fork, and these bearings may be plain cylindrical or coned of steel or bronze, ball or roller bearings, provided with suitable lubricating holes, oil cups, oil chambers or other similar devices. In some cases there are many different parts and the knuckle is quite a complicated affair, but this does not alter the principle of operation. Sometimes the fork projects above the axle for the greater part of its height, this helping to lower the body of the car.

In the Lemoine knuckle there is but one bearing for each pivot. The pivot consists of a single upwardly projecting stud on the inner end of the stub axle, and a hollow socket on the end of the



STRAIGHT TUBULAR AXLE WITH LEMOINE KNUCKLES. DOTTED LINES SHOW SAME AXLE DROPPED.

or split on one side, and bolted on, the bolts causing it to tightly pinch the tube. These arrangements are all shown clearly in the accompanying drawings.

Types of Steering Knuckles.

The knuckles are of vital importance because their failure to support the car is liable to be followed by disastrous consequences if the car is running at speed. An ordinary pivot joint, such as would be used between two rods, would be utterly unsuited to withstand the stresses imposed by the weight of the car and the shocks occasioned by the passage of the wheels over inequalities in the road and at the same time turn freely so as to make the operation of steering an easy one. So a different form of joint is employed. It may be mentioned here that there are three general types of steering knuckles, the Elliott, the reversed Elliott and the Lemoine. The first two are exactly alike in principle and differ only in the arrangement of the parts, while the third is a distinct type.

In the Elliott knuckle each end of the axle is made to form what might be called a massive fork with very short, heavy prongs, the prongs being in the same vertical plane as the axle. A cross-piece is formed on the inner end of the stub axle and is of the right length to fit between the prongs of the fork. A steel bolt passes through holes drilled through both prongs of the fork and then lengthwise through the cross-piece on the stub, a nut holding the bolt in position. The holes are of such diameter that the parts of the knuckle can turn freely on the pivot bolt. The arm to which the connecting rod is attached extends from the

axle proper receives the stud or pivot. The weight of the car holds the parts in position when at rest, but to keep them together when running a bolt is passed through pivot and socket vertically and held by a nut. Various types of bearings and different lubricating devices are used with this knuckle, as well as with the Elliott. In rare cases the Lemoine knuckle has been reversed—the socket made integral with the stub and projecting downward, and the pivot on the axle, projecting downward into the socket. The Elliott knuckle is the most commonly employed form; the Lemoine is by no means uncommon, but is seen less frequently than the other. Other types of knuckle are sometimes seen, some of which are variations of the Elliott and the Lemoine, and some are quite different from both.

Reducing the Leverage.

As the knuckle is placed on one side of the wheel, there is a certain amount of leverage on the pivot at all times, and on the connecting arms when the car is running, as long as the axis of the pivot is parallel to the vertical plane of the wheel. To avoid this leverage the expedient has been tried of placing the pivot and its sockets in the center of the wheel hub, making the hub very large and hollow for the purpose. This results in very easy steering and decreases the stress on the pivot and the connections. Still another expedient is to carry the jaws of the fork of an Elliott knuckle well over the hub of the wheel and to bend the ends of the cross-piece on the stub in the same direction, making the pivot overhang the hub and bringing it closer to the center of the wheel than would otherwise be the case, and so reducing the

leverage. The same result is accomplished, however, by inclining the pivot so that its axis is not parallel with the vertical plane of the wheel, but at such an angle that the axis of the pivot, produced until it meets the ground, will there intersect the plane of the wheel—or, in other words, will strike the center of the tread at the ground. As the degree of leverage is determined by the distance between the vertical planes of the wheel and the pivot at the point of contact *with the ground*, it is clear that if there is no distance between the points there will be no leverage. This is the theory. In practice obstacles in the road come in contact with the tire a short distance above the horizontal ground line, so that, in effect, the two points are separated. The distance is short, however, and in practice the inclination of the pivots gives very satisfactory results, and is the arrangement commonly employed.

In order to relieve the steering connections of the severe stresses imposed by road shocks acting through rigid pivots in the connecting rods and arms, spring joints are frequently employed. The joint is a modified ball-and-socket with the members held in position by a stiff helical spring which will give slightly and act as a cushion against shocks, and will at the same time automatically take up wear. Sometimes connection with the steering gear is made through the connecting rod or one of the arms on the stubs, and sometimes a separate arm is formed for the purpose on one of the stubs.

The materials used for front axles are the different steels, good wrought iron and bronze. Steel is the usual material, and may be anything from ordinary mild steel up to the modern chrome-nickel steel. Wrought iron is rarely seen, though it is occasionally used. Excellent results have been obtained with axles and stubs of cast manganese bronze, the casting process making it easy to produce forms that can be forged only at great expense.

GENERAL FUNSTON'S USE OF AUTOMOBILES.

TACOMA, WASH., August 27.—General Frederick Funston, who is in command of Camp Tacoma, where 7,000 troops are maneuvering, expects to be able to submit an interesting report on the automobile at the conclusion of the encampment. There are two machines at the headquarters camp. One is a small 6-horsepower car, used by the signal corps. The other, a 40-horsepower Royal Tourist, has proved invaluable to General Funston and his staff, who use it to travel from camp to camp.

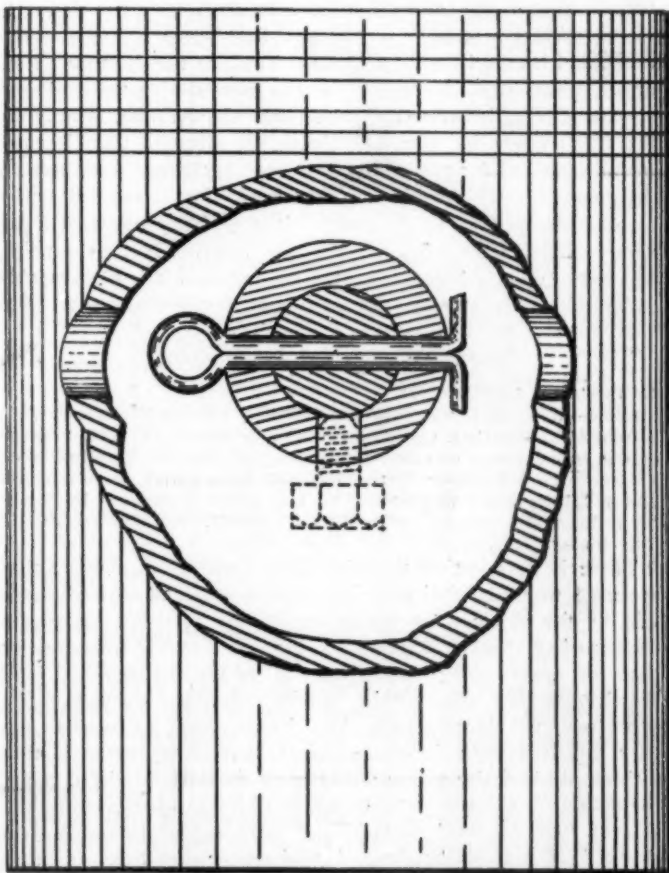
It is the opinion of the officers in camp that the automobile is not alone valuable for work at maneuver camps. They are convinced that it will be of immense value in actual work in the field. The commander of the army corps may, for instance, have the front of his command extend over thirty or forty miles. It is necessary to be able to reach any part of his lines in the most expeditious way possible. Such distances are impracticable for a horse. They can be covered in much less time and with much less fatigue by automobile. In the war of the future automobiles will be used extensively by commanders of large bodies of troops, and by staff officers as well.

A CRUTCH FOR A LAME AUTOMOBILE.

Most automobilists are likely at some time to be brought up against the problem of getting the car home with one tire that is unmendable with facilities at hand. In such a case the question is whether to run home on the deflated tire or to take off the tire and run on the rim. The answer may be a little Celtic—don't do either. Riding on a flat tire is certain death to the tire, and rubber is a luxury that comes high. On the other hand, the rim of the wheel is reasonably sure to suffer from contact with stones and inequalities in the road, and a destroyed rim is not an improvement over a scrapped tire. The best thing to do is to wrap the rim with good heavy rope—it is up to the automobilist to lay hands on the rope the best way he can—and drive home carefully. Of course if the road is good and the distance short the rim cannot suffer severely, but when a long run is taken on the rim the whole wheel is apt to be strained.

EFFECTIVE PISTON-PIN FASTENING.

When a piston-pin set-screw works loose and falls into the lower part of the engine, rattling around loose, there is no telling what serious damage it will do. For instance, it may catch between the bottom of the piston and the top of the crankcase, or on the baffle-plate at the bottom of the cylinder, if there is one, and smash the piston. The broken pieces of the piston could make the engine a wreck in a twinkling. There are other ways the mischief can start, but the result in any case is pretty sure to be serious. Besides, the piston pin itself, if permitted to do so, will protrude and score the cylinder walls. It is therefore important—essential—that the piston pin should be held where it belongs by means that will not work out of place and raise havoc, and in this connection a writer in the Irish *Motor News* describes a simple method of attaining the desired result. The usual set screw, tapped into the piston boss from underneath, is removed,



AN INGENIOUS METHOD OF SECURING THE PISTON PIN.

and a hole is drilled clear through both boss and pin at right angles to the axis of the piston—that is, the hole would be horizontal in a vertical cylinder. Through this hole a split-pin is passed, fitting snugly, and the ends spread. It is necessary to drill through the piston wall before the boss can be reached. The accompanying sketch shows the arrangement. It is obvious that the split-pins must be well fitted in order to prevent the piston pin from working out and scoring the cylinders. The vibration of the engine cannot affect the split-pin, and there is no apparent reason why it should not hold as long as the engine lasts.

London.—The A. C. G. B. I. is arranging a town carriage competition on October 15, only open to vehicles used for town work such as is needed by society. This tour will certainly give an impetus to the further manufacture of petrol landaulettes and broughams for town work, although the exclusion of all petrol vehicles from Hyde Park in the fashionable afternoon hours almost necessitates the acquirement of an electric coupé unless horse carriages are used for the drive in the park.

LETTERS INTERESTING AND INSTRUCTIVE

Base Explosions in Two-cycle Engine.

Editor THE AUTOMOBILE:

[385.]—I have a two-cycle boat motor that has commenced to give me a good deal of trouble by explosions in the crankcase, where the mixture comes in from the mixing valve. Since the engine has run well for months, I know it is no fundamental fault, but nevertheless I am at a loss to rectify it. In the bypass there was a sheet of fine wire gauze, to prevent the explosions from passing downward, and when I found that this was burned down I supposed that renewal of it would be all that was necessary. But although I have made the renewal, the explosions still continue, so it has occurred to me that you may be able to set things right in the columns of your valuable magazine.

R. C. STETSON.

Troy, N. Y.

Most likely the base explosions are due to leakage past the piston, if, as you say, the engine has been used for some time. Is the compression good? If not, you had better refit the piston rings, and it may be even necessary to rebore the cylinder. Naturally, a very slight leakage of the hot gases during the explosion stroke, passing between the piston and the cylinder, will ignite the fuel already in there. Gauze is less effective than is commonly supposed for preventing so-called "backfires," and, even in the engines in which it is employed, backfiring is avoided rather by good design than by the gauze. It is perfectly true that a gas flame will not pass through fine gauze, but this is not the point. The gauze quickly becomes heated red hot, and it is then capable of igniting the mixture on the far side of it.

Larger Wheels for Automobiles.

Editor THE AUTOMOBILE:

[386.]—Why is it that all automobiles are made with wheels so much smaller than those used for horse vehicles? Is it because of the tire expense or some similarly good reason? Knowing that a large wheel is less affected by road inequalities than a small wheel, I have often wondered why large ones would not be better for automobiles.

EDWIN C. WOODLOCK.

Springfield, Mo.

There is no question but what larger wheels than many that are used would be desirable, but because of an ill-advised stress laid by the public upon the matter of the first cost of certain classes of cars, manufacturers are compelled to use tires smaller than are approved by themselves and by the tire people. It is an absolute fact that a thirty-six-inch tire, for instance, of a given sectional diameter, say three inches, costs no more to the user than a twenty-six by three-inch tire. The reason is that a thirty-six-inch tire makes only twenty-six thirty-sixths as many revolutions in going a given distance—with a proportionate reduction of complete road contacts and wear—while its cost is just thirty-six twenty-sixths times that of the smaller tire. In other words, tire prices are so figured that the large diameter is certain to give an increased service that is in exact proportion to its higher cost.

The Pressure in the Exhaust Pipe.

Editor THE AUTOMOBILE:

[387.]—Can you tell me what the pressure in the exhaust pipe of a four by six or eight-inch cylinder car is two feet from cylinders, and oblige a constant reader.

W. S. HAMILTON.

New York, N. Y.

With accepted designs the exhaust pipe pressure is very small, unless a poor muffler is used, in which case it may set up a fairly material back-pressure that acts equally at all parts within the exhaust pipe. With no muffler and straight piping, the exhaust gases as they issue partake more of the character of a blast than they do of a stream under pressure. In fact, if the diameter of the exhaust pipe is greater than the diameter of the opening into the cylinder, the exhaust gases will scarcely make contact with the pipe and will tend rather to create a vacuum close to the pipe walls. In ordinary cases the muffler does set up a pressure of some 10 to 30 pounds to the square inch, differing, of course, with each make of car.

Remodeling a Carbureter.

Editor THE AUTOMOBILE:

[388.]—With my single-cylinder runabout automobile I have a good deal of trouble in getting the carbureter to furnish a proper mixture so that the machine will run slow, without adjusting it so that it floods badly at high speed. I imagine that the trouble is due to the fact that the carbureter is without means of automatic adjustment to the different degrees of suction, and I am thinking of remodeling it so as to get more air at high speed. I would like to have expert advice as to how to do it.

JOSEPH B. ROBERTS.

Onida, South Dakota.

Without knowing the make of your car it is impossible to tell you exactly how to proceed with the proposed changes, or even to pass finally upon the expediency of making them at all. There are so many excellent compensating carbureters on the market at low prices that you should be able to secure one and fit it to your car without much expense or difficulty. However, should you decide to make the alterations, probably the simplest and at the same time a fairly effective means of securing the desired result will be to provide an additional air intake, closed by a small poppet valve, similar in construction to an ordinary inlet valve. This valve, though it will remain closed at low speeds, will open progressively with the increased suction at higher speeds, affording a correspondingly increased amount of air. The exact size of this compensating valve, the strength of its spring, etc., will have to be determined by trial.

The Size of Sprockets.

Editor THE AUTOMOBILE:

[389.]—Is it a fact that the teeth of a sprocket wheel cannot be correctly cut unless they amount to some certain number? I notice that in many American cars the chains are run over six, seven, eight, and nine-tooth sprockets in front, while it is the practice of foreign manufacturers to use very large sprockets both front and rear, gearing down through the bevel gear and pinion, rather than in the chain. And I am told that it is impossible for a small sprocket to work right. Will you please explain the facts of the case to me.

CLARENCE C. LEACH.

Massillon, Ohio.

It undeniably is a bad practice to use sprockets of too small a diameter, not merely because it is difficult to secure proper tooth contours with them, but also because of several other reasons. For one thing, the smaller the sprocket the sharper the chain must bend around it, with consequent increase in the wear upon the chain links and rivets. Very large sprockets, such as are used on the best makes of domestic and foreign cars, bend each link of the chain almost imperceptibly, with the result that this vital portion of the mechanism endures almost indefinitely as compared with what happens to it when run over small sprockets. It is an accepted fact that it is impossible to design spur gears with correct teeth, if the teeth are less in number than ten or twelve, and much the same principle applies to sprocket wheels.

Too Much Lubricant and Overheating.

Editor THE AUTOMOBILE:

[390.]—I recently changed to another kind of lubricating oil for my engine cylinder, and since then I have been greatly troubled with overheating of the motor and by smoke from the exhaust. The new oil seems to give excellent results in every other respect, and was recommended to me very highly by an experienced user, so I can hardly believe it is the sole cause of the imperfect working. Yet I have tried the circulation, and adjusted the ignition and the mixture until I am sure there is nothing wrong with any of these. What do you think is the matter?

Undoubtedly it is the oil. The very fact that you had no trouble before is conclusive. Possibly the new oil is all right, but is used in too great quantities. If it is fairly light and the oil you used before was heavy, it is very probable that you are feeding too much, since too much light oil would cause exactly the symptoms you describe. To convince yourself, try changing back to the old oil, and see if the symptoms do not disappear.

How an Automobilist Was Treated in Lenox, Mass.

Editor THE AUTOMOBILE:

[391.]—While passing through Lenox, Mass., Sunday, August 19, with my family, I was subjected to extremely discourteous treatment, and recite the facts in order that other automobilists will understand the situation at that place.

We were passing through the main street of Lenox on our way to Stockbridge, from Pittsfield; saw no signs as to the rate of speed nor a policeman, but, as we reached the lower end of the street, a man ran out and signaled us to stop. As he had no badge on, we paid no attention to him, supposing that it was merely some loafer or drunken man on a frolic. On reaching Stockbridge we were halted by a policeman, who had been telephoned to from Lenox, and I was arrested. This was about 4.30 p.m., and it was 7.30 o'clock before I was allowed to go upon the agreement of the hotel proprietor to stand my bail. This delay was not through any fault of mine, but simply through the mishandling of the case on the part of the two constables and one deputy sheriff sent down from Lenox to take such a dangerous person in charge.

The hearing took place at Lee the next morning at 10 o'clock, before a Judge Casey; it being testified to that I had gone through a laid trap of one-eighth of a mile at the rate of twenty-three miles per hour; the testimony also said that the officers were in plain sight. This was a lie, as they were hidden behind some bushes or a tree so that they could not be seen until one was exactly opposite them; they also testified that they had their badges in plain sight, another lie. The judge ruled that no signs were required to be posted at the town limits in Massachusetts, nor would he allow me to put witnesses on the stand as to the display of badges, saying that officers were not required by law to display badges.

The judge showed his animosity from the start, and when I asked politely if signs were required to be posted and officers required to show badges, before I would plead guilty or not guilty, he flew into a rage and ordered me to sit down, threatening me with jail if I did not keep quiet. In his summing up he took occasion to laud the officers most highly and to lay me most unmercifully, intimating that he did not believe a word I said, although I had given my testimony under oath. He then fined me \$25, which I paid only because, not being a resident of the state it would have been very awkward for me to have appealed the case. I think the readers of "The Automobile" should be warned as to the treatment likely to be accorded them in this portion of the Berkshires, and, if they are wise, will avoid this section. The people do not want automobilists, and the place is going dead in consequence. I feel that I can speak with some authority on this point, as I was there some two years ago and the change is most marked.

Philadelphia, Pa.

WILLIAM ARROTT.

What One Yankee Saw at the Ardennes.

Editor THE AUTOMOBILE:

[392.]—You undoubtedly have received full particulars from your foreign correspondent about the Circuit des Ardennes, but as I was one of few Americans in attendance I should like to state briefly a few of the noticeable features as compared with the Vanderbilt Cup race, in hope that they may be of use, or at least of interest.

First. The cars prepared for the race with steel studded tires.

Second. The doors of the garages were closed and work stopped on the cars at 6 o'clock the day preceding the race, instead of five minutes before the race, as we do in America.

Third. The cars are not "babied." The drivers in practice take every corner as if in a race, and, as one himself told me, "If they can't stand it before the race, they won't stand it in the race."

Detachable rims were used quite universally.

The course—ah! it was a course and not a race through a crowded roadway. The road itself was neither perfect nor straight; in fact, there were two turns where an almost absolute stop was necessary. Nevertheless, accidents were minor, for the drivers had not waited to learn by sad experience at what rate these turns might be taken in the race.

Several days preceding the race large placards were posted bearing the words, "Danger of death to all animals or persons on the race course on August 13." On the day before the race a substantial wire fence was put up in all sections of the 51-mile course that were at all populated. These fences are made of old tramway rails, posts with four wires, and are used each year. As for soldiers, there were very few. The spectators respected each other's rights, and a victorious manufacturer did not try to stampede the course to prevent a rival's fast finish. Every car that so desired had a clear road for over an hour after the winner had finished.

No automobiles were allowed on the course or beside the course. They were mostly left in large checking squares, while the spectators went on foot to their vantage grounds to view the circuit.

This is but a potpourri of apparent facts in a country that knows far better than do we this game of racing automobiles, and if they are of interest you are perfectly at liberty to use them.

Sedan, France.

"YANKEE."

One Owner's Varied Tire Experiences.

Editor THE AUTOMOBILE:

[393.]—Speaking of tires, there is one thing I should like to have some one who is "up on tires" explain:

Last season I used a certain make of tires, and did not have a blowout or any other trouble with them. This season I ordered another make, but for some reason I received the same make as last year. But I did not lose much sleep about it, as the tires had given me such good service last season.

But what did those tires do this time? The two rear tires blew out within a week of each other, after running only 500 miles, and one of the front tires followed suit soon after.

Then I got what I ordered. The rear tires have run over 2,500 miles and are O. K., and the conditions were the same as last year, except the car weighed 200 pounds more this year than last, 50 pounds per wheel, same roads, same operator, same treatment, same load; also one of the two tires which I used last year as spares, while getting others re-covered, and were re-covered once themselves during the season, has been doing good service in the place of the one of this year's make which blew out long since. It has been run something like 1,800 miles already, and appears to be good for the whole season. This one, by the way, is on the front wheel. The other one has been used as spare, without re-covering since last year, on the rear wheels when the others blew out.

During the last four years I have had experience with six kinds of tires, and my choice is narrowed down to three. Before this season I had only two blowouts, and one of these was a practically new tire, which I think was blown up too hard; the other was an old tire which had paid for itself already.

But the worst I ever ran afoul of was a spare tire which lasted just thirteen days, at the end of which time it was cut completely round on both sides, similar to rim cut, but not that, as it never was flat, and was carrying a fair load. To end up with, it pulled out of the rim twice and obliged me to run fifteen miles on the rim, as my load consisted of women and there was no place to put up. The road being fair, I made the distance with little damage, and during that entire season I had neither blow-out nor puncture or any trouble whatever, except with that tire.

Last season I was obliged to put in new angle irons on the sub-frame as a result of the strain and twisting due to bad roads, wash-outs, 11-inch ditches across the road, stones, etc. Yet through all this the engine gave little trouble, and the tires absolutely none. The other day, while out for a short drive, I thought I "smelled" something, and on investigating found that the sub-frame which carried the engine had let go on both sides forward, which made it "interesting." But with the aid of a little wire, which I always include in my "sundries," we came in all right.

F. BROWN.

Westover, Penn.

A Cure Suggested for the Metallic Pound.

Editor THE AUTOMOBILE:

[394.]—I read Mr. F. N. Temple's description of the trouble he had with his engine in a recent number of THE AUTOMOBILE. He says his engine gives a metallic pound and also overheats, as is evidenced by the continued running when the current is shut off. In addition to the other possible causes which you mentioned, might not a tight piston produce the same symptoms? Too snug a fit between the piston and cylinder will certainly cause the engine to overheat, regardless of the quantity or kind of lubricating oil, or of a normal supply of cooling water. Also, if the piston sticks in the cylinder, at the moment when it reverses its direction, it will give a backward jerk on the bearings, immediately followed by the forward shock of the explosion, and this alternate pull and push on the bearings will result in a metallic knock if they are loose at all. If the piston sticks only very slightly when the engine is cold, as it heats up the trouble will increase owing to the expansion of the piston. If the engine turns over, with the relief cocks open very much harder when hot than when cold, it is a sure sign that the piston is too big for the cylinder. Mr. Temple's trouble may occur only in one of his cylinders, and this may be determined by holding down first one and then the other of the vibrator springs on his coils. To cure the trouble, the piston of the offending cylinder must be removed and ground to a more accurate fit. A first-class machinist could probably do it, but the facilities of the factory where the machine was made would insure a better job.

Northville, Mich.

J. S. LAPHAM.

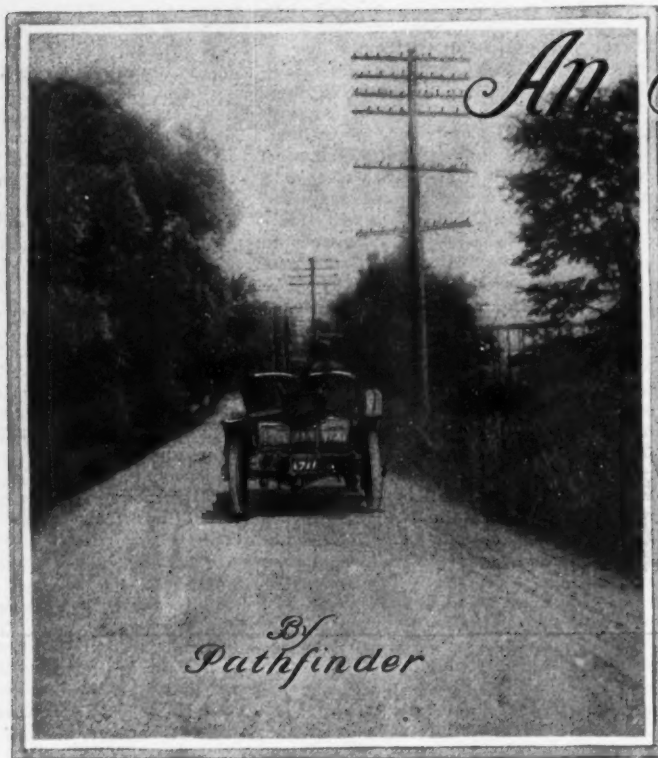
Here's an Idea for Electric Makers and Agents.

Editor THE AUTOMOBILE:

[395.]—Can you inform me if there is a list of charging plants in New Jersey, New York and on Long Island? I have received a great many inquiries asking if there is such a list. Don't you think it would be a good idea to publish one and to advocate such a thing? It would be a great convenience to owners of electric.

Brooklyn, N. Y.

R. R. BENNETT.



"WHO IS THERE ON A SMOOTH, STRAIGHT ROAD CAN RESIST 65 MILES AN HOUR?"

FROM Detroit to Buffalo in a day had prepared us for the good night's sleep which we had, and enjoyed as only tired men can after an innings in the open.

The way to Rochester out of Buffalo is on Main street, which stretches into the country, just as does the main street of every other small town in the land. Sunday morning, between the times of breakfast and church, as we started Packard "Thirty" on the secondary stage of our little journey, we obeyed the strict ruling concerning speed, and watched for motorcycle policemen, who, we had been told, were vigilant in their pursuit. When Main street led into a macadam country road still better, and there was nothing ahead or behind or underneath to stop the wings of speed with the last reef let out—except conscience and occasional signs reading: "Slow Down to Ten Miles an Hour"—we hit the merriest clip that the car could do, and a merrier one than any that had preceded. It was truly great, for who is there on a straight, smooth road can resist sixty-five miles an hour if the car will make the speed-meter dance in tune above that figure? And here I tell the truth and remark it, because I was surprised, and perhaps even Huff himself, at the way we went.

But there is an end, even to the world, and, like the end of the world, this macadam path ended in clay and sand and twenty miles an hour. We plugged and plugged, and I tried to think of some other word, but could not, that would better express that tiresome going over roads that are not good enough to be enjoyable or bad enough to cause trouble or serious delay.

Now, also, it was church time, and the highway became dotted with family rigs bound townward. So, while we had set speed laws at naught back on the macadam, we again assumed our role of peaceful citizens and stopped and slowed and ran wide, that we might make no enemies for the next autoing party or the fraternity. Also, we knew that at Scottsville we would again strike macadam, and once more experience the wild joy of speed.

Our anticipation was fulfilled. Around one wide turn, as safe as a straight road to take at full speed, we came upon

An 800 Mile Try-Out From Detroit To Gotham

a big car, which, from its low hang and narrow tread, bespoke the proud exotic. We left it in a tantalizing trail of dust, although it pricked up its spark when it heard us coming and tried to show us the way.

An Experience with Some Central New York Mud.

We stopped in Rochester at the genial Mandery's garage for oil and gasoline, and let him look under the bonnet to see what the new motor might be like. He wanted to hunt up a possible customer and show him, too; but there are limits, even in the automobile business—and the sky appeared leaky. So we lunched quickly, and struck out for that wiggly, hilly, crazy, clayey road that winds through poverty-stricken, worn-out farm land, and crosses the Erie canal so often that, before you get to Syracuse, you almost envy the three miles an hour of the canal-boat along its level, straight course.

We passed through all the towns we could find and crossed all the bridges that were ever built—so it seemed. Finally we met our Waterloo. At a new bridge, the approaches were not graded, and it was necessary to run through a field to get, eventually, onto the road again. A laborer at the bridge shouted, but he shouted too late. When the car stopped it was axle deep in the blackest, wettest, stickiest mud there is this side of the river Styx.

As often as we tried a new expedient the car would sink another inch. So we quit expedients and went at it manually, with the assistance of three men from the bridge building staff. We laid boards under the rear wheels, dug out mud back of the front wheels, lifted the front axle on a long plank lever, whose fulcrum was layers and layers of board that sank into the mud, "cranked her up," and backed out.

We had intended to go to Utica that night, but had wasted so much time and become so tired in and around that mud-hole that when, east of Syracuse, we ran into a rain belt and slippery roads, we decided to stop at Canastota.

We were afterward glad of this stop, for Canastota is worth while. It possesses, first of all, Mr. Weed, originator of a certain anti-skid tire chain, and is proud of the pos-



"WE SET SPEED LAWS AT NAUGHT."

session. I have a smoldering idea that the lack of repair on the roads in that section is due to local desire to see Mr. Weed wax rich. Certainly his idea has proved efficient.

Secondly, Canastota possesses the Weaver House, and he who passes the Weaver House passes a treat. It is brand new, and the proprietor will explain all of its various high-class features to you. Then the combination porter-night-clerk-bell-boy will escort you to your room, letting you select the one that best suits you.

Leaving Canastota in the morning, we followed an uncertain road, wet over every inch and slippery where it was not sticky, to Utica. At a stop for a few minutes at a well-kept garage for gasoline, we here encountered another touring party, which was resting and "seeing" Utica during the wetness. Further on, after we had swung well along into the picturesque road that trails the New York Central, the canal, and the Mohawk river, and taken our eyes often from the roadway ahead to look over the wonderful valley at our right, we rounded a sharp turn where the trail was cut, railway-like, out of rock, and there found, by the roadside, an automobile, a tent, and a family. They automobilized by day and tented by night, and when the road was not good for riding. They had here picked a good spot—close to all evidences of commercial civilization, and yet on the edge of a stage so wonderfully set with the scenery made by nature for the Indians who owned the trail before the Railway Kings butted in, that—sitting there, even in that swaying, rushing car, which was the very essence of modernism—my memory brought forth nothing more appropriate than an old song I had heard sometime in boyhood:

"Sweet is the vale where the Mohawk gently glides
"On its fair, winding way to the sea."

From Classically Named Utica to the Hudson.

The miles of slippery, ruddy clay and dirt, of newly made and unfinished and torn-up road, and of stretches so covered with water that our progress was marked by one long continual swish of muddy spray to the side, and reminded me of the taking on of water of a New York Central flyer—the miles of arduous splashing, slipping, crashing, thumping, ended in a smooth street that led first into the brand new, spick-and-span Amsterdam and then on into the older and much nicer Amsterdam of Dutch days. Here, by a hotel and faced westward, we saw a much-driven car, bearing a number and the insignia of the American Automobile Association, and we knew it to be a returning Gliddeneer.

Along the railway, as the road trailed into Schenectady, we passed a small army of huge black, slope-end electric engines—the forerunners of turmoil and revolution in railway methods. They go to New York to pull trains through that fearful tunnel which has been for years the bloodiest blot on the escutcheon of railroading.

Wet though it yet was, the traveling into Albany was smooth enough, and we rushed it, so that we were almost surprised when we ran down that town's only wide street and halted a moment to look upon the most notorious state capitol ever built.

Varying Roads and Pink and Blue Farmhouses.

Over the Hudson to Rensselaer, we found the road southward to be so superb in its new macadamness that we lit out in earnest for the first time that day. A trolley runs beside the macadam path, and we sighed and sighed for a car going our way, that we might match our speed against it and show its driver and its passengers what a puny thing it really was. At a crossroads our sighing was rewarded, and we hesitated briefly to allow the electric to get into a good swing. Then we went. The road is straight and sure, and was trafficless. It rises over successive crowns that are not high or steep enough to visibly retard, but of sufficient moment to afford downward flights that make the recollection of a ride in the



"MILES OF UNFINISHED AND TORN-UP ROAD."

Twentieth Century Limited seem like youthful dallying with a toy train, or a trip on some "scenic railway" a mere dream in a rocking chair.

The electric car was left below a rise that we had skimmed; the shaft on the speedometer snapped. Still we hurtled southward, until—at a township line probably—our race-course became a mire. As we floundered and pitched and slipped, trying to maintain a decent headway on a rolling road of stone flags set in parallel rows, the electric car came up behind us and rushed past. Automobiles are good enough; we want roads.

All that afternoon we slipped, and slid, and skidded. Tire chains were put on and came off, and were put on. We met a family party in a limousine. They asked us how far back of us the road was wet. We told them:

"As far as we can remember."

They hesitated, and we left them discussing the advisability of going on.

We passed a small village where all of the houses were pink; a few miles further on we passed another, where they were all baby blue. The mind of man certainly follows strange highways.

After awhile the road was ironed almost smooth, and we began to make time. Then evening warned us to slow up, and, somewhat carefully but still speedily, we started on the last seventy-five miles to New York, over a road wet and slippery, but still wide and smooth. It climbed hills and sank into crevices in the face of the earth. We lighted the headlights and one of the sidelights. The latter we held in the car, that we might turn its yellow rays upon crossroads sign boards to learn the way.

At a farmhouse we stopped for a drink of water. The boy of the place said:

"Last night a feller in an auto run into my buggy."

We deplored the accident, and the boy's father came out to the road and discussed accidents, automobilizing, automobiles, automobilists with us. He had no word of criticism of the vehicle or of the class. He only said that some drivers were careless, and agreed that all vehicles should carry lights at night. The farmer is generally sensible if handled sensibly.

Approaching the Metropolis Along the Hudson.

The road snaked around between the rocks, and once in a while gave us a fleeting glimpse of the dark, stately Hudson. We passed through towns, each successive one a little more metropolitan in its appearance and visible habits. We ran down long lanes, edged on the one side by the high stone fences of country estates, and on the other by trees that hid rock walls. There was chance of accident here, and we drove carefully around corners. To meet a team or another car on one of those rocky turns meant disaster. Mr. Huff, as designer of the car we were in, was naturally proud of

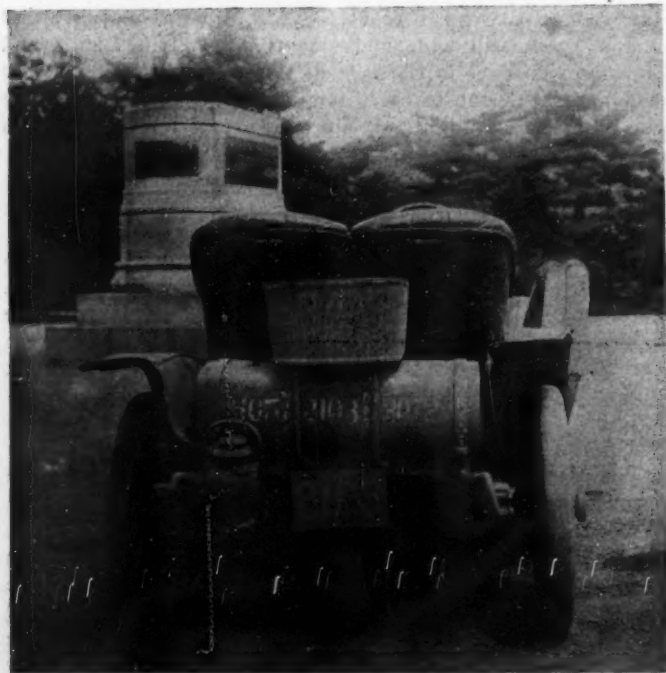
its hill-climbing prowess and its speed possibilities, and proud to show it off when the road was clear and the way visible. I have previously skidded to my full appreciation, and I was glad that he held the motor in check on that ribbon-obscured trail through the hills, where, in darkness only pierced by our own lamps, the lights of some town or the twinkling glimmer from farmhouse window, we were both awed and chastened in sporting spirit by the matchless wildness of the ride.

Night driving gives one an erroneous impression as to the speed at which he is traveling, but you cannot resist the belief that help comes from some source in preventing catastrophe to the occupants of automobiles. There is a fascination about night riding which enhances to an appreciable extent the delights of automobiling—and these delights seem to grow and never to pall upon that one who has succumbed to its allurements.

There is a rare intellect in a deep valley just above Peekskill. He runs a grocery tavern. We had stopped to inquire the direction, and he became loquacious.

"You're right at the foot of a h— of a hill. Most of 'em breaks down on it, and if they don't on that one they get into trouble coming down this other, just back of you. That's why I got a 'phone in here. They stops in to telephone to New York. About a hundred and fifty of 'em go by here every day, and I am going to build a char-ge over there where that flower bed is. Best place in country—right here at foot of two hills."

We were disappointed in the "h— of a hill," however, and once more continued the same chase through night, and hills and towns. Now, these become endless suburbs. Here is a white, squat building high on the bluff above the Hudson. This must be Irvington, for there John Brisben Walker established the most unique publishing plant in the world. Now we draw into Yonkers and rush through. There may be policemen, but it is too near New York to care, and the 775 miles will be soon over. Yes, this is upper Broadway. But a few minutes more, now, and we will run the car into the Packard garage. A few minutes more and we have made New York in three days, and in less than thirty hours of actual running. A few minutes more and we will go to a hotel, ask for a telegram blank, wonder what is the best thing to say to-night, after this ride we have made, and will then take the pencil and write the one conclusive word: "Thirty."



"THIRTY."

BOOKS OF AUTOMOBILING.

An Authoritative Work on the Storage Battery.

Inquiries of correspondents for books discussing storage batteries suggest an editorial reference—for the information of others—to the work entitled "Storage Battery Engineering," by Lamar Lyndon, M.E. This is an American work, now in its second edition, that may properly be called an exhaustive practical treatise for engineers. It gives sufficient of the theory and mathematics of the subject to make clear the principles and functions of the battery, and yet is not one of those abstruse discussions which, however profitable from an academic standpoint, are of little use to the busy engineer for every-day reference. The purpose of the author is very clearly set out in the preface, thus: "It is intended to assist the engineer in designing, installing and maintaining battery equipments, and to guide him in the selection of types of batteries and auxiliary apparatus best suited to the service which they are to perform, and at the same time impress upon the technical public both the advantages and limitations of the storage battery in practice."

The scope of the work is broad; so that after the principles of the battery are elucidated, the subsequent discussion is of the battery as a source of energy and of the mechanical apparatus by means of which the energy can be utilized. Details of the special applications of the battery to such services as automobile propulsion are consequently omitted, but nevertheless the work is indispensable to those concerned in the construction or intelligent operation of electric vehicles.

It contains 360 pages, 170 illustrations and diagrams, and four large folding plates. The work is for sale by the Class Journal Co., Flatiron Bldg., New York. Price, \$3 postpaid.

Pocket Memorandum for Automobilists.

"The Man A Motoring" is the title of an interesting little book issued by the Arc-Spark Mfg. Co., of 125 West Thirty-second street, New York City. The book contains the automobile laws of the United States, blank pages ruled for expenses while touring, and records of runs, motor car engagements, automobile records, and other facts of interest. The little work will be sent free to owners of automobiles.

GOVERNMENT ROAD EXPERIMENTS.

The work of the Office of Public Road Inquiries, in the Department of Agriculture, is primarily educational in character. Its province is to detail engineers and experts to give information and advice. Whenever there is any question as to what road material is best suited for the local conditions, samples of all the available materials may be sent to the laboratory of the office, where tests will be made to determine the selection of the best material. In the majority of cases the detail of an engineer or expert to make a preliminary investigation and give advice is all that is required. There are, however, communities where it has been found advisable to supplement advice by a practical demonstration of effective road building. To meet this need the object-lesson method was adopted on the following plan: A section of road is selected for improvement, and after the proper surveys and estimates have been made by an engineer of the office, expert foremen and machinery operators are sent out in charge of modern road-building machinery, and the local officials are taught by actual demonstration every step in the proper construction of a road. Absolutely no expense is incurred by the Federal Government in this work except for the salaries and expenses of the government employees, the local communities being required to furnish the right of way, all common labor, materials, teams, etc., used in the work.

The total number of experimental and object-lesson roads built under the direction of the office since its organization is 96, the roads being built in 28 states. The materials used in construction were shells, gravel, brick, oil, tar, sand, clay, marl, stone, slag, and steel track.

WESTERN CLUBS SHOWING SPECIAL ACTIVITY

Chicago Has a New Automobile Club.

CHICAGO, September 3.—A charter has been received from the Secretary of State of Illinois acknowledging the incorporation of the Chicago Motor Club by George G. Greenburg, Charles P. Root, William H. Arthur, Joseph F. Gunther and J. W. Hayden. The sole purpose of the organization, as is outlined by one man vitally interested in the new club's formation, is to combat unfair automobile legislation and secure more liberal conditions in future enactments. It is stated on good authority that Mr. Arthur, who is a prominent attorney, has volunteered his services to the new club as legal adviser, without charge. The incorporators also state that the club has not been formed in antagonistic spirit to the Chicago Automobile Club, as there is plenty of room in a city of Chicago's size for more than one club. A definite outline of the plans of the club will be made public in a few days.

At the meeting of the directors of the Illinois State Automobile Association, to be held Wednesday evening, September 15, at Algonquin, executive officers for the ensuing year will be elected. Prospective legislation, especially such as affects the recognition of motorists from other states, good roads and other movements for the advancement of automobiling, will be discussed. It is planned to turn over the signboard movement, inaugurated by the Chicago Automobile Trade Association, to the state association, which, it is believed, has it in its power to further the movement most effectively in all parts of the state.

The first big motor cycle endurance run ever held in the West will be run September 14 and 15 under the auspices of the Chicago Motor Cycle Club. The entire distance of 292 miles will be divided into two days' trial. The start will be from the club house at the Hotel Bertrand, Hubbard court and Michigan avenue, thence to Waukegan and Milwaukee. The return will be to Waukegan and the finish at the club house in Chicago.

Rhode Islanders Propose to Contest Unfair Arrests.

PROVIDENCE, R. I., September 3.—Three new members were elected at a recent meeting of the governors of the Rhode Island Automobile Club. At the same meeting the action of the Warwick authorities, in sending notices regarding speeding to automobilists, was discussed. It was the general feeling that automobilists are not fairly treated, their speed being guessed at instead of being accurately determined by timing over a measured distance. In case members of the club are molested by the Warwick officials, the club proposes to take the matter into the courts and determine the legality of such action. The idea of the club is not to obstruct the enforcement of the law, but to endeavor to have the laws properly administered.

It is likely that the club's annual hill-climbing contest will take place some time in September, somewhat earlier than usual. The event is sure to be interesting on account of the keen competition for the Prescott Knight Cup, which must be won three times in succession before it can be taken from the custody of the Rhode Island Club.

W. Penn Mather, president of the R. I. A. C., recently returned from his tour of Europe. Mr. Mather and the Misses Mather toured in a big car and returned filled with enthusiasm over the experience.

A. E. Hughes, of Philadelphia, who is one of the oldest members of the Rhode Island Club, has presented to that organization the flags he used during the recent A. A. A. tour, in which he finished with a perfect score—one of the Big Thirteen.

Eugene M. Sawin, secretary of the Rhode Island Automobile Club, recently made a very pleasant tour of western Massachusetts in a six-cylinder Ford, accompanied by his family.

A. C. of California Rapidly Increasing Membership.

SAN FRANCISCO, CAL., August 30.—Now that the three-days' run of the Automobile Club of California is a matter of past history, the Runs and Tours Committee is planning another run, this time to Santa Cruz, which will take the form of an endurance contest. It is figured that this will prove the most interesting run that has been conducted by the club since its organization.

The Increase Membership Committee of the club has been a very active principle in club affairs recently, and as a result of its efforts thirty-six new members were added to the membership rolls at the last meeting. At this particular time, when the club has so many matters in hand that are of particular interest to automobiling in general, it is necessary that the organization stand prominently forward and include on its list every owner of a car in and about San Francisco. The work of the committee, which consists of Harry N. Stetson, George E. Middleton, John H. Speck, E. P. Brinegar and George P. Moore, speaks for itself and is highly complimentary to the gentlemen mentioned.

Automobilists on the Pacific coast believe that the opportunity exists here for some interesting hill-climbing contests. There is no place in the United States where natural conditions lend themselves so universally to this form of sport.

Minneapolis Enjoying a Floral Parade To-day.

MINNEAPOLIS, MINN., September 3.—Extensive preparations are being made by the Minneapolis Automobile Club for a big floral parade, which will occur the evening of September 6, during the state fair. It will be the first affair of its kind to take place in the northwest. Many Minneapolis people have participated in similar affairs in California and in the east, and with the knowledge which has thus been gained, it is expected that the parade will equal anything of its kind ever given. A list of attractive prizes has been offered for the best decorated cars. There will be separate prizes for both men and women drivers. Five of the leading jewelers have contributed prizes valued at \$20 each for the ladies, while for the men there will be five cash prizes amounting to \$300.

Grand stands will be erected along the line of march. Golden rod, wild sun flowers, and dozens of other native Minnesota field flowers, will form the chief part of the adornments. With these brightly colored leaves will be blended, and with the gardens in full and luxurious bloom, Minneapolis should present a floral auto parade that will rival anything ever seen in the country. The Automobile Club will have full charge of the event, with J. S. Spargo as chief marshal.

Cleveland A. C. Will Hold Auto Field Day.

CLEVELAND, O., September 3.—No automobile races will be held in Cleveland this year, and instead the Cleveland Automobile Club is making plans for a field day to be held at Glenville track the latter part of the present month, at which the following program of events will be run: Twenty-four-hour endurance contest, ending at 2:30 P.M.; 100-yard dash and change of tire; stoppage contest against horses; half-gallon contest; one-mile nearest to three minutes; obstacle race; obstacle race, including horse-drawn vehicles; slow speed on high gear; backing contest; pick-up contest; egg obstacle race.

The club will be represented at the meeting of the Cuyahoga County Good Roads Commission, September 6, by Directors A. Ward Foote, George Collister, T. W. White, Oscar Dreher, Charles Shanks, F. T. Sholes, W. C. Baker, G. J. Bradley and Vernon H. Burke.

Kansas City A. C. Changes Date of Endurance Run.

KANSAS CITY, Mo., September 1.—At a meeting of the Kansas City Automobile Club held early this week, it was decided to change the date of the 100-mile endurance from September 12 to September 11. The reason for the change of date is a good one. One of the towns through which the route lies, Spring Hill, Kansas, is holding a country fair on that date, and the club wants to take no chances with a large assortment of runaway horses.

The Kansas City Automobile Club will shortly adopt a distinguishing sign for members, in the shape of a shield to be attached to the front of the radiator. Several sketches have been submitted, but no decision has yet been made.

Endurance Run of N. Y. M. C. Postponed Till November.

NEW YORK, September 5.—The postponed economy contest of the New York Motor Club will be held on or about November 1. The Contest and Technical Committee of the club discussed the matter at a recent meeting and decided that the event should not be dropped, but only postponed until the stir caused by the Vanderbilt Cup Race has subsided. Owing to the pressure of business caused by preparations for the great race and also the getting out of 1907 models, manufacturers did not enter for the contest as freely as was expected, and the postponement was the result.

CLUB DOINGS IN GENERAL.

DETROIT, MICH.—The pretty club house of the Detroit Automobile Club at Pine Lake is the scene of many little dinner parties these fine September evenings. Many members take advantage of the fine run from the city, and as the cuisine is good at the club house, the dining room is very well patronized.

BINGHAMTON, N. Y.—Secretary Norman Pierce, of the Binghamton Automobile Club, announces that the club officials are considering a club run to New York, to partake of something of the nature of an endurance test, for which prizes will be offered. Fully fifty cars are expected to participate. The date for the run will be set during the present week.

JOPLIN, Mo.—Automobilists of this city are about to organize a club for their mutual protection and enjoyment. The movement is looked upon with favor by the Road Commissioners of the county, who anticipate much assistance from the autoists in aid of the good-roads movement which is now attaining such a firm foothold in Missouri. The large number of automobiles in this vicinity makes the prospects of the new club a very bright one.

PEORIA, ILL.—It is quite probable that the Peoria Automobile Club will hold a run to Bloomington some time in September, the Bloomington Automobile Club having agreed to meet the Peorians at Danvers and act as their escorts into the city, also to make their stay in Bloomington a pleasant one. This will be the most pretentious run ever undertaken by the Peoria Club, and a full turnout of members is expected.

WOODSTOCK, ILL.—The McHenry County Automobile Club was given a day at the County Fair, August 29. A parade was arranged for the main attraction, the finish of which was decidedly unique. Numbers were assigned to the cars by President A. J. Olsen, and then L. T. Hoy led the odd-numbered cars one way and J. H. Patterson the even-numbered cars the other way to the track. A program of novelty and other races was successfully carried out.

SAN JOSE, CAL.—The automobile dealers of this city have practically decided to form a club organization for social purposes.

The club, although primarily formed by the local trade, will not have anything commercial about it, but, as the dealers and owners of automobiles in the vicinity would like a place of meeting, a club is the only logical method of solving the problem. The organization will not in any way conflict with the Automobile Club of California, but will work unitedly with it for the advancement of automobile interests.

LARAMIE, WYO.—There are now eighteen first-class automobiles owned in this city, which now ranks pre-eminent in Wyoming as the leading autoing center. Laramie also has an automobile club, with many leading citizens on the membership roll and officered as follows: President, Elmer Lovejoy; vice-president, Jesse Converse; secretary, E. Greenwood. There has been a disposition on the part of drivers of teams to make matters unpleasant for automobilists by their persistent refusal to observe the rules of the road in this vicinity, and one of the prime objects in organizing the clubs is to obtain for its members equal highway rights. There has been no reckless driving here on the part of automobilists and a careful observance of the speed laws has been the rule.

**THE AUTOMOBILE CALENDAR.
AMERICAN.****Shows.**

- Sept. 22-29.....—First National Automobile Parts Show, First Regiment Armory, Chicago; A. M. Andrews, Secretary, 184 La Salle Street, Chicago.
- Dec. 1-8.....—Seventh Annual Automobile Show of the Automobile Club of America, Grand Central Palace, New York City, under the patronage of the American Motor Car Manufacturers' Association.
- Jan. 12-19.....—Annual Automobile Show of the Association of Licensed Automobile Manufacturers, Madison Square Garden, New York City.

Tours.

- Sept. 12.....—100-Mile Endurance Run, Kansas City (Mo.) Automobile Club.
- Sept.....—500-Mile Endurance Test, Grand Rapids (Mich.) Automobile Club. (Date to be announced later.)
- Oct. 1-2.....—St. Louis, Mo., Automobile Parade and Carnival, St. Louis Automobile Club.
- Oct. 20.....—Philadelphia, Pa., Cross Country Run of the Philadelphia Automobile Club.

Race Meets and Hill Climbs.

- Sept. 22.....—American Elimination Trials for Vanderbilt Cup Race. (Long Island Course probably.)
- Oct. 6.....—Vanderbilt Cup Race, American Automobile Association.
- Jan. 22-26.....—Ormond-Daytona (Florida) International Race Meet. Florida East Coast Automobile Association.

Motor Boat Races.

- Sept. 10-15.....—National Motor Boat Carnival, Hudson River, New York City. Under the auspices of the Motor Boat Club of America.

FOREIGN.

- Oct. 5-14.....—Leipzig (Germany) Exhibition, Krystall Palast.
- Nov. 1.....—New Zealand International Exhibition opens at Christchurch.
- Nov. 1-16.....—Berlin (Germany) Automobile Exhibition.
- Nov. 15-24.....—London Olympia Motor Show.
- Nov. 23-Dec. 1.....—London Stanley Show, Agricultural Hall.
- Dec. 7-23.....—Paris, Ninth Annual Salon d'Automobiles, Grand Palais.
- Dec. 15.....—Calcutta, India, Exhibition of Automobiles, etc., Automobile Association of Bengal.

Races, Hill-Climbs, etc.

- Sept. 8.....—Racing on the Sands at Skegness.
- Sept. 9-20.....—Pallanza (Italy) Automobile Meet.
- Sept. 27.....—Tourist Trophy Race, Isle of Man, A. C. of Great Britain.
- Oct. 7.....—Chateau Thierry (France) Hill Climb.
- Oct. 23.....—Gaillon (France) Hill Climb.
- Oct. 30.....—Start from Paris of the Gordon Bennett Aeronautical Cup Race.

A THOUSAND MILES IN CALIFORNIA.

By JOHN W. SWAN.

The man who has yet to tour in California has a treat in prospect to which he may look forward with much anticipation. Recently, in company with Mr. Greenshaw, the owner of the sturdy Northern car which we used and of which W. C. Vaughan was the driver, a thousand miles and more of Californian roads were traveled. Starting from Los Angeles with San Diego as our destination, we toured over what is called the inland route



THE OLD PALA MISSION BELL TOWER.

and surmounted some of the worst mountain grades in California. To one who has never been in the mountains, these grades cannot be appreciated. For instance, the Pala grade, beginning at the old Pala Mission, is three miles long, with an average of not less than 15 per cent., one pitch for nearly one-quarter of a mile being about 21 per cent. After you are on top of the grade you can appreciate that you have been up quite a distance, as going down you may coast five miles, actual measurement, without ever starting the engine, reaching the same level from which you started, at the Pala river. While this is the worst grade we made on the San Diego trip, there are half a dozen that come very close to it.

Returning, we took the coast route near the seashore, found all bridges in a bad way, and the roads well nigh impassable on account of washouts and swollen streams. On this route there is one place where it is necessary to get right down on the beach in the pure white sand for over a mile, and the car did all this work



STUCK IN THE QUICKSAND, SAN LUIS REY RIVER.

without a murmur, although it was necessary in instances to use block and tackle to cross streams and climb banks.

After returning to Los Angeles Mr. Greenshaw made another tour, taking in Yosemite and going up country as far as Sacramento. On this last trip many grades were encountered nearly as steep as on the southern trip and the roads were in much worse condition, as there was some mud because of heavy rains.

MACADAMIZED ROAD TO THE ADIRONDACKS.

UTICA, N. Y., Sept. 3.—A preliminary survey has been made for macadamized roads, such as are built by the State, through the heart of the Adirondacks from Old Forge to Blue Mountain. The general plan proposes that the road shall start from New York city, proceed thence to Albany, to Utica, Remsen, Old Forge and Fourth Lake. The road will then follow the northern shores of Sixth, Seventh and Eighth lakes to Blue Mountain.

The scheme is to return by way of North Creek to some point on Lake George, and thence to Albany and New York, the starting point. The circuit will include all of the Fulton chain of lakes and nearly all the Adirondack and other resorts en route. It is said that this improved highway will be built from the \$50,000,000 fund recently voted by the state for highway improvements and new state roads. There will be comparatively little to do in the way of new road building between Utica and New York, as much of that distance has already been covered by the state, but the improvement along this stretch will be extensive. The road from Utica to Old Forge will be improved by widening and macadamizing. Then through the Adirondack Mountains, where the course follows the highway, the road will be improved, but for the most part the road will be new.

HOLLAND DOUBTFUL FOR AMERICAN CARS.

Consul-General S. Listoe forwards from Rotterdam the names and addresses of Netherlands automobile dealers, which can be secured from the Bureau of Manufactures of the Department of Commerce, Washington, D. C. Mr. Listoe describes the trade in that country as follows:

The import duty on automobiles in the Netherlands is 5 per cent. of the value. Nearly all motors use benzine, which can be had everywhere, and costs from 8 to 10 cents per liter (1.0567 quarts) retail. The restrictions with reference to the storage of benzine are very reasonable and do not affect the consumption. Automobiles are generally imported from European countries with the tires on. It seems, however, to be the opinion of dealers that it would be better to have American automobiles arrive without tires, but with steel Westwood rims, purchasers preferring to buy the tires here. Automobiles arriving by rail are usually imported set up in crates, but when arriving by vessel from the United States it is considered best to have them knocked down in cases. While the general condition of the roads and highways of the Netherlands is good, the country has thus far been a poor field for the sale of cars.

The dealers in automobiles do not, as a rule, purchase direct from the manufacturers; the trade is practically in the hands of appointed agents who have the cars in commission. In order to sell automobiles in the Netherlands, the cars should be on the spot for inspection with a live representative to solicit orders from dealers. While there are no special obstacles to the introduction of American goods here, there are no special advantages. The length of time it takes for articles ordered to reach the Netherlands, the smallness of the stock for inspection and to fill immediate needs, and the "cash against documents" payment system, are certainly to the disadvantage of American manufacturers.

S. T. DAVIS, JR., CLIMBS MOUNT WASHINGTON.

During his recent tour of the White Mountains, S. T. Davis, Jr., president of the Locomobile Company of America, accomplished the eight-mile climb of the winding carriage road up famous Mount Washington. Commenting upon his ride, Mr. Davis said:

"We had five aboard, and, from inquiries at the toll gate, the Locomobile seems to have been, with one exception, the only touring car that has made the ascent with a full complement of passengers. This exception afterward had some trouble in descending the mountain. My car behaved beautifully, though I do not think that I would have made the trip had I know more of its difficulties. On the way up I passed the Half-Way House without getting water, and then had to search for over half an hour to find some. Otherwise we would have made the climb in less than an hour."

TACOMA'S FIRST COMPLETE GARAGE.

TACOMA, WASH., August 16.—The Acme garage is the first complete concern of its kind on the north Pacific coast. It occupies the entire ground floor of the building on Tacoma avenue. It is complete in every department, and from the exterior one of the striking features is the one providing for the entrance



ACME GARAGE, RECENTLY OPENED BY HARRY HURLEY, TACOMA

of cars by one door, and exit at the other. Harry Hurley, the proprietor, is one of the oldest automobile dealers on the north Pacific coast. The entire ground floor of the building, 1010-16 Tacoma avenue, is devoted to the Acme garage. Immediately upon entering the garage cars are run back to the cleaning department. Here is also the workshop and a pit five feet deep, which will facilitate repairs. A Bowser pump arrangement has been adopted for the pumping of gasoline into the garage from the tank some distance back of the building.

RAISING THE ROOF IN ST. LOUIS.

Down in St. Louis they have learned to literally "raise the roof" without making any serious disturbance; the proof of this may be seen in the photograph below published of the garage of the Mississippi Valley Automobile Company. This concern found that its business was increasing at such a rate that the roof was in danger of being forced off, so it was determined to build another story. Jacks were put under



HOW A GARAGE'S CAPACITY WAS EASILY DOUBLED.

the roof and it was raised 11 feet and the walls built up to meet it. That it was no small task may be gathered from the fact that the roof is 80 feet wide and 150 feet deep and weighs about 200,000 pounds. Business was not interrupted for a moment during the process, and the big electric sign on the roof burned each night in its accustomed way.

AN INDUSTRY OF RAPID GROWTH.

Aluminum castings were a rarity a few years ago, and any foundry which secured an order for a few hundred pounds thought that it was doing an immense business in this line. Beginning with the almost exclusive use of gasoline engines in automobiles and motor boats, demand for this material has increased rapidly, until to-day there are a few firms using from 500,000 to over 1,000,000 pounds per year, nearly all of which goes into engine and transmission cases, and the large producers of aluminum castings are devoting their entire attention to this line.

One of the most successful producers in this line is the Syracuse Aluminum and Bronze Company, of Syracuse, N. Y., which was incorporated during 1905 by men associated with the Brown Lipe Gear Company. For the practical end of the business they secured men thoroughly familiar with brass and aluminum foundry practice, and no expense was spared in equipping an up-to-date plant. Manufacturers of automobiles knew that the backers of the company would not have gone into it unless they were positive that the product of the company would be of the highest grade. The result of this confidence on the part of the manufacturers was an entirely unexpected volume of business.

The greatest element of success outside of the "know how" is the care which is exercised at every stage of manufacture. In the first place nothing but ingot metal is used, and before this is put in the melting crucible each and every ingot is broken and inspected. The process of melting is one of great importance, as the best metal can be ruined entirely with very slight inattention at this stage. Aluminum in its molten state has a great affinity for gases of all kinds, particularly oxygen, and if any great amount of this is absorbed by the metal it results in a serious reduction of the strength.

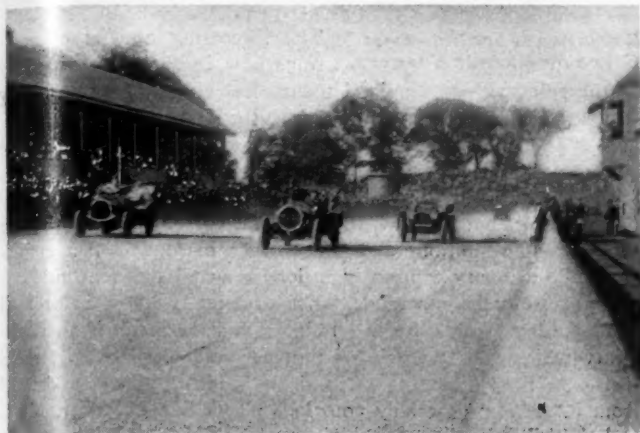
Another important point is the temperature at which the metal is poured; in fact, it is quite possible to vary the strength of two test bars from the same pot of metal fifty per cent. by changing the temperature at the time of the pouring. Of equal importance is the proper gating of castings, requiring knowledge on the part of the molder which can only be acquired by experience, it being different from the method used in either iron or brass. On account of the comparatively small number of men who have had an opportunity to obtain this knowledge, they are able to demand and secure the highest rate of wages; in fact, it is only the most skilled workman who can accomplish good results. Before being molded each and every pattern is gone over carefully and thoroughly studied to insure that this important point is properly understood.

On account of the large shrinkage of aluminum it is essential that the cores used be properly made, sufficiently strong to stand the heat of the metal, but not so hard as to prevent the natural shrinkage, thus causing cracks and weak spots in the castings. After the casting has been successfully made, it goes to the cleaning room, where the cores are taken out, the gates cut off, and is trimmed up. It is then passed along to the shipping room, where it is thoroughly inspected for minor defects, boxed up and shipped.

The demand for aluminum during the last year has been such as to create a shortage in the raw material, and during last winter a number of automobile builders were seriously delayed on account of inability to secure castings. This shortage of material is growing worse instead of better, and the indications are that castings for 1907 cars will be exceedingly hard to obtain unless the builders promptly provide for their requirements. In anticipation of such a condition of affairs, the Syracuse Aluminum and Bronze Company has already placed its orders, and specified deliveries for ingot sufficient to run at full capacity until August 1, 1907. Of this amount the greater portion is already sold, but guaranteed deliveries can be made for orders placed immediately.

BIG CROWD WITNESSES THE NEW JERSEY MEET

FREE admission, free seats, free interpretation of the rules and freedom from unpleasant features were characteristics of the Labor Day races at Weequahic Park, Waverley, N. J., under the auspices of the New Jersey Automobile and Motor Club. Though there were no racing cars present, Oldfield and Bernin having successfully resisted the temptation to establish



POPE-HARTFORD AND NATIONAL NIP AND TUCK IN 5-MILE RACE.

records on the half-mile track, the touring cars did some good racing and the huge crowd present got a lot of fun out of it all. The free interpretation of the rules resulted in cars entering for races which called for full equipment, stripped almost to the limit. It was all for sport, however, and no one seemed much bothered by the fact that so many contestants forgot their fenders, lamps, steps and other little items of equipment.

Eight cars started in the 25-mile handicap, which was won by a 16-horsepower Reo driven by F. C. Stowers, in 37 minutes 44 seconds. John Price's 24-horsepower Autocar was second, and F. E. Boland's 30-35-horsepower National, the scratch car, was third.

Three Indians of 2 1-4 horsepower started in the 5-mile motorcycle race, and P. Drummond won in 7:52 3-5. In the third event, a 5-mile race for cars costing from \$750 to \$1,500, the starter did his conscientious best to get the three contestants away together in a flying start; but luck was against him, and he had to gather the cars together and send them off from a standing start. H. J. Koehler's 22-horsepower Buick got away first and stuck to the head of the procession until finishing in 7:25 2-5.

President J. H. Wood's cup was the prize for the next event, a 5-mile handicap. Koehler and the Buick again won, the time being 7:16.

A surprise was sprung in the fifth event, a 5-mile race for regularly equipped touring cars costing \$1,400 to \$3,000, when A. H. Whiting, in a Stoddard-Dayton car, complied with the rules calling for regular equipment and came to the tape with all his lamps, mudguards, and so on, and the car finished third despite the eccentricity of its owner in complying with the rules. M. H. Apgar finished first with a 25-horsepower Pope-Hartford, half a lap ahead of Boland and the National.

There were no restrictions as to equipment for the 10-mile free-for-all, and the five contestants were stripped to the bone. Five out of six original entrants failed to enter, but four new entries were made, so that there were five starters. James Ward drove a 22-horsepower Buick fast enough to win, covering the distance in 14:14 2-5; Koehler and the other Buick took second place. Koehler won the pursuit race, and the timers got so interested in the chase, when Koehler's Buick chased Roland's National for three miles, that they omitted to take the time.

The last event was a 5-mile handicap for the New Jersey Auto-

mobile and Motor Club Trophy, which is to be up for competition for the next five years. John Price, with a 24-horsepower Autocar, won in 6:5 1-5, with E. Scheffler, 20-horsepower Jackson, second.

TWENTY-FIVE-MILE HANDICAP FOR CARS COSTING FROM \$750 TO \$4,000.

1. Reo, F. C. Stowers, 3:30..... 37:44:00
2. Autocar, W. I. Fisk, 2m..... 38:00:00
3. National, F. E. Boland, scratch..... 39:36:30

FIVE-MILE RACE FOR MOTORCYCLES.

1. Indian, P. Drummond..... 7:52 3-5
2. Indian, E. Allen.
3. Indian, C. E. Seiter.

FIVE-MILE RACE FOR CARS COSTING FROM \$750 TO \$1,500.

1. Buick, H. J. Koehler..... 7:25 2-5
2. Jackson, C. W. Oathout.
3. Reo, F. C. Stowers.

FIVE-MILE HANDICAP, MEMBERS ONLY.

1. Buick, H. J. Koehler, 40s..... 7:16
2. Reo, F. C. Stowers, 1m.
3. Autocar, W. I. Fisk, 30s.

FIVE-MILE RACE FOR CARS COSTING FROM \$1,400 TO \$3,000.

1. Pope-Hartford, Chester C. Henry..... 7:30
2. National, F. E. Boland.
3. Stoddard-Dayton, R. T. Newton.

TEN-MILE FREE-FOR-ALL.

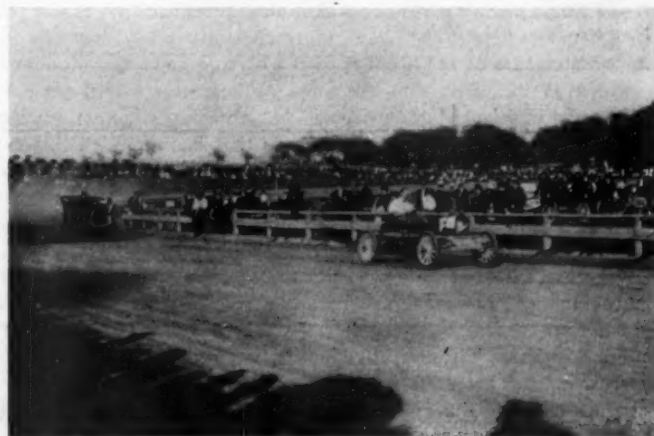
1. Buick, James Ward..... 14:14 2-5
2. Buick, H. J. Koehler.
3. Pope-Hartford, Chester C. Henry.

PURSUIT RACE—DISTANCE, THREE MILES.

1. Buick, H. J. Koehler..... 4:35
2. National, F. E. Boland.

FIVE-MILE HANDICAP FOR NEW JERSEY AUTOMOBILE AND MOTOR CLUB CUP.

1. Autocar, W. I. Fisk, 45s..... 7:23 4-5
2. Reo, F. C. Stowers, 20s.
3. Buick, H. J. Koehler, scratch.

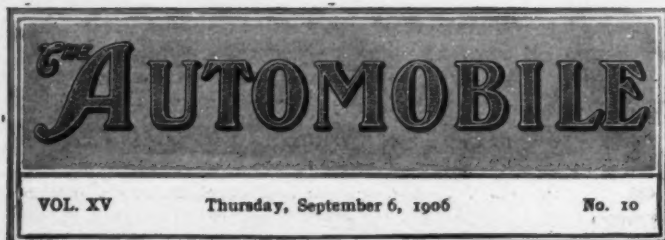


KOEHLER IN BUICK, LEADING IN 10-MILE FREE-FOR-ALL.

WHITMAN AFTER CHICAGO-NEW YORK RECORD.

L. L. Whitman, who recently placed the transcontinental record at 15 1-4 days, has started on another record run with the six cylinder Franklin car that he drove from San Francisco to New York. He left Chicago at 2 o'clock Tuesday morning, in an attempt to beat the record of 58h. 53m. from that city to the metropolis.

He reached South Bend, Ind., at 5 o'clock, cutting half an hour off the record for the run of 86 miles over sandy roads. Whitman expected to reach New York City about 6 o'clock Thursday morning.



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Does High Speed Racing Pay the Manufacturer? An announcement by the Paris representative, who disposes of the greater part of the product of the leading German automobile concern, to the effect that the company hereafter would not participate in high-speed contests, will not occasion any vast amount of surprise, in view of the non-success that has attended this car in competition ever since the Irish Gordon-Bennett race. It must be admitted that for touring this make has answered in as satisfactory a manner as before, but in racing its laurels have been appropriated by other firms in France and Italy.

Whether the advertising results that accrue from participation in racing are commensurate with the cost and possible loss of prestige in defeat, is a matter on which much difference of opinion exists. Those who win say yes; those who lose by a narrow margin are doubtful, and those who fall early by the wayside seldom give the fast game another trial. That the German car mentioned has profited enormously as a result of its early racing successes is well known, and its withdrawal may not be followed with such unanimity on the part of other concerns as the company undoubtedly hopes for.

Racing has not reached the end of its tether by considerable; but it will reach an end in the not distant future. Of this, none of a discerning mind can doubt. Speed in excess of the extreme limits of safety has nearly been attained, and not a few believe that for all practical purposes it has been passed. High speed has betrayed much structural weakness, and in consequence deserves credit for its eradication. Unusual attention has been directed to the motor-driven vehicle through racing, and its performances have been heralded far and wide, adding most substantially to the general prestige. Those cars which have partici-

pated in these strenuous motor battles have had their names printed thousands of times, and the constant repetition of a name is good advertising. As for the winning of the prize itself, the victor has obtained a proportionately greater publicity, though the average reader seldom remembers more than the name of the winner. But, having seen names in print repeatedly before the event itself, the reader unconsciously associates all cars so mentioned as being in a class that stands out very clearly. This is why the "also rans" benefit by participation in notable contests—either racing or touring events.



Autotrap Warnings Best Given by Garage Keepers.

The increasing number of autotrap now in operation, especially in the smaller New England towns, has already become a very serious matter to automobile tourists generally. In the aggregate it is a considerable financial burden, all the more dreaded because of the injustice so often tucked away in it. As things are now, one is likely at any time to be "held up," not only without warning, but even when speed is kept entirely within safe limits—road conditions and every other reasonable fact considered. So ordinary caution is no longer an all-sufficient guide.

It is absolutely impossible for a stranger to know beforehand what the legal limits are in all places, and the result is an uncertainty which robs the trip of the care-free pleasure so large a factor in the enjoyment of, and the benefit otherwise derived from it. A few especially notorious places like Leicester, Mass., and the villages along the main routes of Cape Cod, are fairly well known. But who, for instance, would expect a regular, all-day "trap" on the upper end of East Hartford, Conn.

The chances are that this sort of thing will increase rather than decrease. Probably nothing can be done about it, except by co-operation between autoists themselves, to lessen its hazards. The tourist is not only "up against" a time-and-distance system especially devised for his undoing, but the petty personal financial interests of the local authorities in the scheme are a factor against which good judgment in driving, and even a conscientious observance of the speed laws, are not always proof.

Information passed from one autoist to another at the time has its limitations, but in default of some effective general system it is better than nothing. A correspondent suggests that at first two signs might be adopted. One, the right hand elevated, with the first finger pointing upward, to indicate a police trap; another, the elevation of the open left hand as a warning of a dangerous curve or bad place in the road ahead. The latter is not especially an autotrap sign, but the suggestion is good, nevertheless.

Not long ago we heard it advocated, with no little enthusiasm, that signs warning tourists of autotraps should be erected by clubs and individuals, exactly the same as guideboards. This is all right in theory, but with two vital and fatal objections: First, the changes in location and character of these traps (one of the "beauties" of the system); second, the fact that signs of this kind would probably stay up about as long as it would take the person who actually put them up to get out of sight. They would interfere too much with the local industry of auto-catching.

It seems to us that the most practical good along this line can be accomplished by garage owners. One in Hartford, Conn., already has a blackboard in a prominent place for observation by outgoing cars giving in chalk-marks the location and character of well-known local traps, and other seasonable warnings. It is easy to keep such a local system of information up to date, and while it is not easy thus to notify tourists making long-day runs, it is a beginning in the right direction, and should be encouraged. It might almost be said that garage keepers owe such a service as this to their customers and the touring fraternity at large.

Incidentally, it is curious to note that "autotrap" seems to have jumped quickly into good standing as another of the combinations of "auto," especially in the newspapers. At least, it has the virtue of appropriateness and a descriptive faculty that none can mistake.

ANNUAL CONFAB OF THE GOODRICH.

AKRON, O., Sept. 1.—A three days' conference was held this week, closing Friday, between the officers and local sales managers of the B. F. Goodrich Company and the thirty branch managers and traveling salesmen of the company. The tire branch of the trade was alone represented and discussed, and plans were laid for the coming year after suggestions were heard from the various managers and salesmen. It was announced after the conference that there will be no general changes in tires this coming season except wherein improvements can be made in perfecting the present styles.

The visitors were guests of the company at the Portage Country Club Friday at dinner, and the afternoon was devoted to golf and other sports at the golf grounds. The branch agencies of the company are as follows: New York, Chicago, Philadelphia, Buffalo, Denver, Cleveland, Detroit, Boston, St. Louis, Oakland, Cal., and London. Very favorable reports were made by the visiting agents.

CONCERNING A. M. C. M. A. MATTERS.

Twenty-six firms now hold membership in the American Motor Car Manufacturers' Association, three recent additions being the St. Louis Car Company, of St. Louis, makers of the American Mors; Pierce Engine Company, of Racine, Wis., which is to include in its line a 40-horsepower car, and the B-L-M Motor and Equipment Company, of Brooklyn, which concern has a car entered in the American Elimination Trial. Members of the association are given preference in spaces for the December show in the Grand Central Palace, New York City. Alfred Reeves, the general manager of the A. M. C. M. A., has headquarters at 29 West Forty-second street, New York City.

AJAX TIRE AND GRIEB RUBBER CO. COMBINE.

Announcement has been made that the Ajax Standard Rubber Company, of New York, has amalgamated with the Grieb Rubber Company, of Trenton, N. J., and the organization thus formed will be known as the Ajax-Grieb Rubber Company; the plant will be at Trenton and the executive offices in New York. Horace DeLisser, who has been the head of the Ajax company, will be president of the combination, while C. H. Oakley will be vice-president and Harry Grieb secretary and treasurer. Headquarters will be established in the New York automobile district within a few weeks, but shipments will be made from the Trenton factory, where shipping facilities are exceptionally good. In addition to the big Grieb plant, two factories for making Ajax tires will be built this fall.

WHITE STEAMER WON SPECIAL RACE.

LOS ANGELES, CAL., September 1.—Somewhat unsatisfactory was the outcome of the 100-mile race between a White and a Reo, referred to in the last issue of THE AUTOMOBILE. The two cars were tearing along something more than forty miles from the start, with the Reo in the lead, when a rim flew off one of the wheels of the gasoline car and rolled away into the great unknown, apparently, for a three hours' search by Harris Hanshue, the driver, and his assistant failed to locate the missing circle, and the Reo was unable to finish. The White, driven by Captain H. D. Ryus, passed the Reo and finished in 4 hours 18 minutes—the best official time on record for the course.

FOSDICK SECURES THOMAS FOR BOSTON.

Boston, Sept. 3.—The Harry Fosdick Company, which is located in the Motor Mart, is to handle the 1907 Thomas line. Harry Fosdick has been connected with the automobile trade in Boston since automobiles were sold, starting with a steam runabout, then having charge of the Winton Motor Carriage Company agency and this year carrying a diversified line, including the Baker electrics, Studebaker, Orient, and Fiat.

CLEVELAND MOTOR CAR CO. INCORPORATES.

The Cleveland Motor Car Company, of Cleveland, O., was incorporated on September 1 with a capital of \$300,000; the company has been in existence, unincorporated, for two years. The following officers were elected: William L. Colt, president; James Laughlin, 3d, vice-president; A. R. Davis, secretary and treasurer; S. W. Hartley, engineer and superintendent. Directors, James Laughlin, Jr., H. Hughart Laughlin, Dexter Fairbank, James Laughlin, 3d, A. R. Davis, S. W. Hartley, and W. L. Colt.

Three hundred cars of 30-35 horsepower each will constitute the output for the season of 1907, the cars being finished at the factory in the Whitney Power Block, at East Thirteenth and Power streets, Cleveland. The following agencies for the Cleveland car will be continued for 1907: New York, E. B. Gallaher; Philadelphia, Diamond Motor Car Company; Boston, Butler Motor Car Company; Pittsburg, Colonial Automobile Company; Chicago and Milwaukee, Cassaday-Fairbank Manufacturing Company; St. Louis, St. Louis Automobile Company; San Francisco, J. W. Leavitt & Co. The general offices at Cleveland will continue to handle the local trade, as heretofore. Offices and salesrooms will be removed about December 1 from 390 Erie street to the new factory in the Whitney Power Block.

TOLEDO'S NEW AUTO LAW.

TOLEDO, O., September 1.—After nearly three years of vain endeavor to decide upon regulations for governing the running of automobiles in the Toledo city limits, the city council has at last adopted drastic measures. The new regulations provide a speed limit of ten miles an hour and a minimum age of fifteen years for drivers of automobiles. In case of accident the chauffeur must stop and give his name and the name and address of the owner of the machine to the persons concerned in the accident or to any spectator who may demand the information. The penalty for the first offence is \$25, and each subsequent transgression will be punished by a fine of \$50 and a sojourn of ten days in the classic shades of the workhouse.

It is believed that these severe regulations are the result of a number of accidents, in which the offending automobilists have turned tail and fled without stopping to render assistance to their victims. The question of licenses is not touched upon by the new measure, but City Solicitor Northrup is preparing a license ordinance, which will be presented to the city council for approval within a short time.

WHITE MOUNTAINS 1907 RELIABILITY TRIALS.

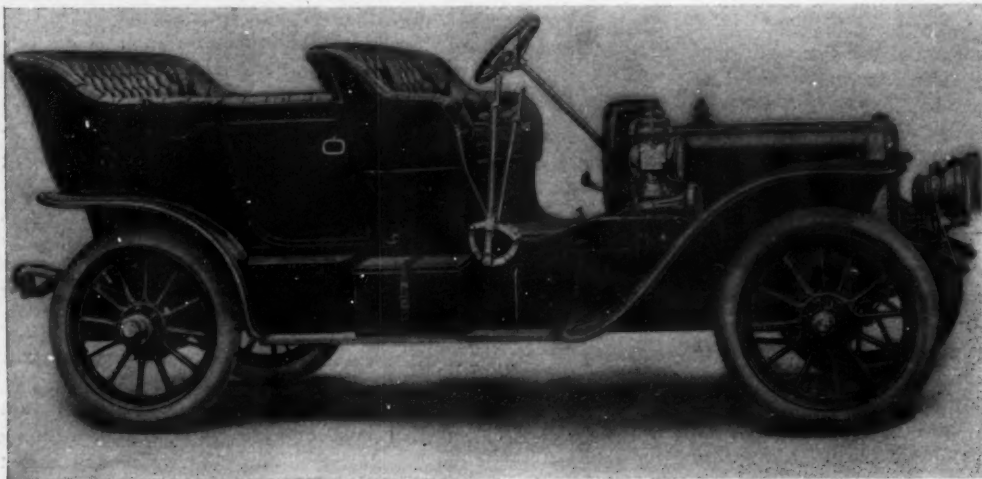
The first week in July has been selected as the time for holding the White Mountains 1907 Reliability Trials at Bretton Woods, N. H. A preliminary will be a 1,000-mile run, starting from New York, going to Boston, then to Portland, Me., and concluding at Bretton Woods. From this point there will be runs in several directions, and all standard classes of touring cars and runabouts will be provided for. A special event may be a resumption of the "Climb to the Clouds" up Mount Washington, though this contest will not figure in the score of the reliability trials. A joint committee of representatives from A. A. A. clubs and the manufacturers will be asked to draft the rules and assist in the conduct of the trials.

AUTO PASSENGER LINE FOR SAVANNAH.

SAVANNAH, GA., Sept. 3.—Captain M. Edward Wilson, a well-known automobile dealer of this city, has petitioned the Common Council asking for a franchise for an automobile passenger service on Bull street, starting from the City Hall. It is understood that the consent will be given, and that the line will be in operation inside of the next month. Subsequently the service will be extended to other parts of the city. Mr. Wilson's idea is a ten-cent single fare with a five-cent price for those who purchase ticket books.

NEW WINTON MODEL M.

Two models will be manufactured by the Winton Motor Carriage Company, of Cleveland, O., for the 1907 season instead of the single model built for 1906. Model K, the 1906 car, will be perpetuated in Type XIV., which will be similar in its main features to its predecessor, while the new machine, designated as Model M, has a number of features new in the Winton product and has a motor of 40 horsepower—10 horsepower more than the



NEW WINTON MODEL FOR 1907 WITH 40-HORSEPOWER MOTOR AND SLIDING GEAR TRANSMISSION.

older model. Model M has comfortable seating capacity for seven passengers, two being carried on revolving seats in the tonneau, while the front seat carries the usual two and the rear seat three. Drive is by propeller shaft.

Perhaps the most notable features of the new Model M are the adoption of a four-speed sliding gear change-speed mechanism in place of the individual clutch type, and the use of mechanical control instead of the air system which has become thoroughly identified with the Winton. Both individual clutch transmission and air control are retained, however, in Type XVI.

In the four-speed sliding-gear transmission of the new model direct drive is on the third speed; when the direct drive is engaged there are no gears in mesh in the gearbox and the secondary shaft is idle. Annular ball bearings are fitted to the gear shafts. The reverse pinion is out of mesh when the reverse is not in use. Any gear can be picked up at once from the neutral position without going through other gears, and all the operating mechanism excepting the lever and connections is inclosed in the gearcase. Special devices make it impossible to throw in the reverse accidentally or to pass the neutral position when the clutch is engaged. Hand brake and clutch are interconnected.

The clutch is of the multiple-disk type, having fifty disks, all of high-carbon steel, running in oil in a tight case on ball bearings. There is no end-thrust when the clutch is engaged. The large frictional area, and the film of oil that covers the plates when the clutch is "out," prevent any sudden gripping or "fierceness" of the clutch, and the car can be started even on the highest gear without shock or jar.

In the motor the principal feature of note is the offsetting of the cylinders so that the thrust of the connecting rod is almost vertical on the explosion stroke. Cylinders have a bore and stroke of five inches each; cylinders are cast in pairs, with integral water jackets entirely surrounding each cylinder. Connecting rods and pistons are long, and pistons are fitted with three rings each. Special attention is given to equalizing the weights of all reciprocating parts, so that there will be no vibration due to unequal weight. Valves are all mechanically operated and are interchangeable, being all alike; all are placed on the same side of the engine and are operated from a single camshaft. The camshaft gears and cams are entirely inclosed, and the camshaft has the novel feature of being offset from the push-rods in the same

way that the crankshaft is offset from the cylinders, with a view to giving a more direct valve action and reducing the thrust on the guides.

Ignition is by jump spark, with roller contact timer and current furnished by storage battery with solid electrolyte which cannot leak or splash out of the jars. The carbureter is of the annular float type, with the nozzle in the center, and is noiseless in operation. The throttle is operated by hand or by foot, there being connections to a lever on the steering wheel and to a foot button; connections are mechanical.

Lubrication is by Hill mechanical oiler driven from the camshaft. The gasoline tank, of 22 gallons capacity, is carried at the rear and the gasoline is forced to an auxiliary tank on the dash by two pounds air pressure, flowing from the small tank to the carbureter by gravity. A gear-driven centrifugal pump circulates the cooling water through the vertical-tube radiator.

Wheelbase is 112 inches and tread standard; tires are 34 by 4 1-2. A steel dust pan protects the mechanism from dust and mud, while pressed steel mudguards protect the passengers.

The front guards extend clear to the body of the car, leaving no open space for mud to fly through. Several options are given in the matter of finish. The new car is listed at \$3,500, complete, as a touring car; the chassis alone costs \$3,250, and with limousine body, \$4,500. Any type of special body can be placed on the chassis.

The twin springs that have been a characteristic feature of the 1906 Wintons are used in the rear suspension of the new machine, and the general appearance of the body and the shape of the hood show plainly the Winton design. Though a large car, Model M is designed and proportioned with a skilful avoidance of any appearance of clumsiness or unwieldiness.

A CAR FOR SIGNAL CORPS SERVICE.

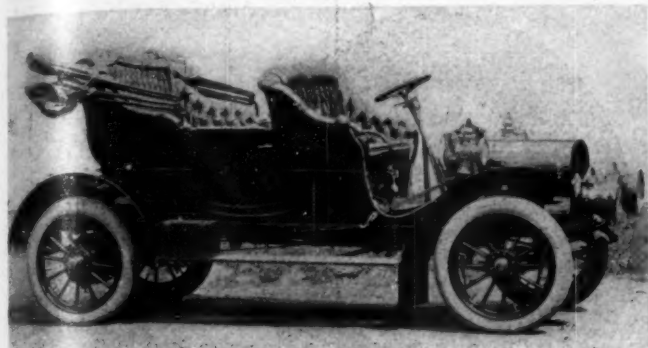
TACOMA, WASH., September 1.—Additional interest is being taken in the military camp—Camp Tacoma—because of the employment of a specially-constructed Cadillac automobile by the Signal Corps. The car, illustrated herewith, has a space back of the driver's seat in which signalling apparatus may be stowed. The design was worked out by General Greely, commander-in-chief of the Pacific division. General Frederick Funston, who is in command of the camp, will probably have something to say about the car in his report after the camp breaks up in October.



CADILLAC SPECIAL CAR FOR SIGNAL CORPS SERVICE.

ADAMS-FARWELL 1907 MODEL.

Few changes, and those of a minor nature, have been made in designing the 1907 models of the Adams-Farwell cars, manufactured by the Adams Company, of Dubuque, Iowa. The mechanical equipment is unchanged from 1906, and the few alterations about the body make for the greater comfort and convenience of the passengers. As is well known, the Adams company equips its cars with revolving cylinder air-cooled



ADAMS-FARWELL 40-45-HORSEPOWER TOURING CAR

motors placed under the cars with crankshafts vertical. The motor in the car illustrated herewith has five cylinders of 5-inch bore and 5-inch stroke, and is rated at 40-45 horsepower. A double-clutch sliding gear transmission gives four speeds forward and a reverse. The body is of the side-entrance type, with individual front seats and a rear seat 52 inches wide; the wheelbase is 108 inches. Wheels are all 34 inches in diameter, fitted with 41-2-inch tires. The frame is of trussed angle steel. Dark blue is the color of the body. As there is no machinery under the large hood, the space is fitted for use as storage room, the top lifting up like the cover of a trunk. Different types of bodies are fitted, a specialty being an enclosed body, which can be driven from the inside or from the outside, in the latter case the chauffeur occupying a folding seat in the front.

CIGARETTE SMOKING COSTLY IN INDIANA.

CLEVELAND, O., Sept. 1.—George C. John, sales manager of the St. Louis Car Company, who is conducting a demonstration tour in the new 24-32-horsepower American Mors, from Chicago to New York and Boston, recently visited Cleveland, showing the car to the local trade. Mr. John says that while the roads across Ohio show a spasmodic effort toward reconstruction and systematic maintenance, there is a more noticeable influence of automobiling in the widespread erection of guide boards.

Mr. John also says that there is a \$37.50 hole in his pocket-book, which reminds him that the touring automobilist in Indiana is less liable to be mulcted of his hard-earned money because of scorching than because of handling cigarettes carelessly in the presence of rural guardians of the law. Mr. John's cigarette mishap was occasioned by his giving a "stick" to another member of the party at South Bend, Ind.

AN AUTO MART FOR NEW YORK CITY.

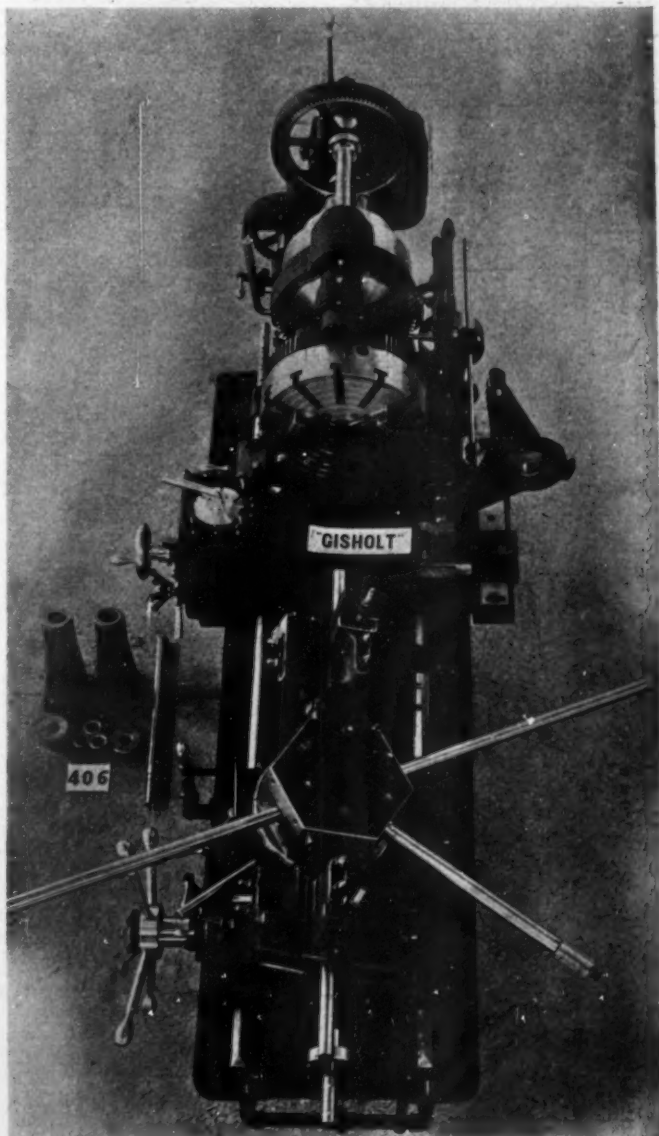
If plans already well under way do not fall through, New York will soon have an automobile mart. Interested in the idea are W. I. Fickling, E. R. Lozier, S. H. Elliott and Harry V. Kibbs, who have secured an option on a building at Broadway and Sixty-second street, which was built on speculation as a garage and automobile saleshouse, and is handsomely designed and entirely fireproof. The only thing necessary to insure the plan being carried out is a sufficient number of applications for space. An automobile mart established in Boston has proved very successful, and there is no apparent reason, the promoters of the New York plan state, why a local mart should not be even more successful, the field being more extensive.

SOME UP-TO-DATE MACHINERY.

There are many manufacturing establishments where the work necessitates the production of considerable numbers of parts, but where there is hardly enough work to keep any machine busy on one class of work. For such shops the "Big Bore" lathe manufactured by the Gisholt Machine Company, of Madison, Wis., is especially designed. It is capable of handling a wide variety of work, and yet is a reasonably rapid machine in the production of duplicate parts.

The machine illustrated herewith has a swing of 21 inches and can be used for chucked work within its capacity; while for bar work there is a hole clear through the spindle which may have a bore of 5 inches or of 6 1-4 inches, at the option of the purchaser. A tool carriage of very convenient design is furnished in addition to the turret head and carriage, and on the back of the tool carriage is mounted the steady rest for work that requires to be supported against the thrust of the cutting tool.

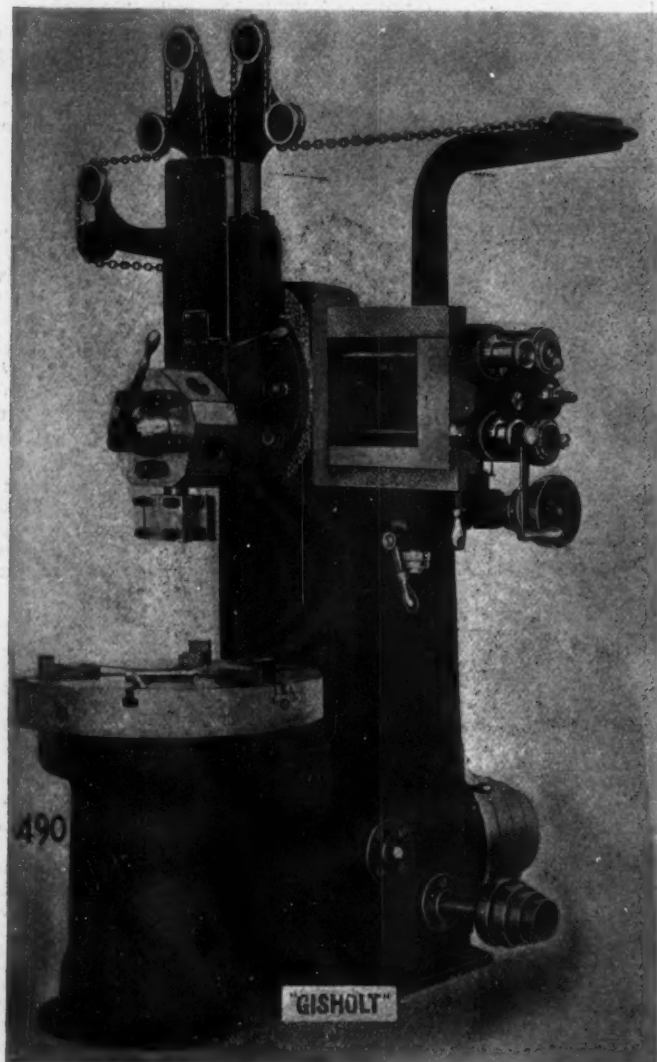
An electric motor of 7 1-2-horsepower is incorporated in the lathe shown in the photograph, though this may be omitted if desired. A controller on the front of the machine enables the operator to vary the speed of the motor from 400 to 1,600 revolutions per minute, and this, in combination with the friction back-gear head, permits the use of almost any speed, giving a very wide range. The motor drives through a Morse silent chain. An oil pump is fitted to deliver oil to the point of the cutting tool; oil pans catch the drip and an oil hood prevents



GISHOLT BIG BORE TURRET LATHE AS VIEWED FROM ABOVE.

the flying of lubricant when the machine is running. The Big Bore lathe is made with either 21-inch swing or 24-inch swing. The Gisholt company states that a number of automobile manufacturers are using these lathes with satisfactory results.

In the second illustration is shown a Gisholt vertical boring mill. This machine is, in principal, like a lathe set on end, and its design makes it particularly suitable for boring and facing heavy pieces that would be difficult to properly chuck on the face-plate of a lathe, but which can be laid on the revolving table of the boring mill, blocked up and bolted down, and machined in a convenient position for observation. The machine illustrated has a plain table 28 inches in diameter and has an extreme swing of 34 inches, will take work 17 1/2 inches high under the rail, occupies a floor space of 63 by 63 inches, is 93 inches high and weighs about 5,000 pounds. There are 16 speeds available through the headstock gearing. Particular attention has been given to the feeds. These are graduated to read to one one-thousandth part of an inch, and by the use of the micrometer feeds the use of scale and caliper is made unnecessary, the index on the machine giving the measurements of the cut. Each feed is fitted with an automatic tripping device which can be set to



VERTICAL BORING MILL MADE BY GISHOLT MACHINE COMPANY.

stop the feed at any point decided upon by the operator, and will also automatically trip the feed at the limit of its run. The machine is framed up in heavy and substantial fashion, so that heavy cuts can be taken without springing or chattering; the slides have wide bearing surfaces and are accurately finished by scraping. The micrometer feed dials will be seen at the end of the horizontal ways.

NEW TURNBUCKLE FOR HARTFORD TIRES.

A reference to the smaller of the two illustrations shown in this column will show the new form of turnbuckle which will be fitted regularly for 1907 and thereafter to all Hartford universal rims taking either Dunlop or clincher type of tires. It is made on the same principle as the turnbuckle originated by the Hartford Rubber Works Company in 1904, but is improved in ease of operation by the use of a square-end crank wrench in place



NEW TURNBUCKLE
for Hartford tires, Dunlop
and Clincher types.

CRANK-WRENCH OPERATING TURNBUCKLE.

Loosening and tightening are simply reverse operations.

of the former round-end key. This device enables one to adjust the tire to the rim without difficulty, the turnbuckle taking up any variation in the diameter of the rim, ensuring that perfect fit of tire to rim which is essential to safety as well as to long, even wear. The processes of attachment and detachment are greatly facilitated. Both the principle and operation are shown at a glance in the illustrations. The device is in principle a small worm gear, made integral with the right-and-left threads connecting the two ends of the expanding ring in the rim. Threads and gear being one piece, no "give" is possible to either, and the action of spreading apart (for detaching) and drawing together (for attaching) is made positive and effective by the square-end crank wrench fitting the center opening in the portion below the rim. This wrench takes the place of the former round-end turnbuckle key as an additional convenience.

Great care has been taken to give the turnbuckle the most positive location, so that no part of it can move in the slightest degree from the opening through which access is had. The larger illustration shows the turnbuckle in process of loosening (for detachment) or tightening (for attachment). When a space shows between the ends of the ring (as in this view) it is loose, and as soon as the ring is taken off the deflated tire may be removed. Conversely, after the tire and rim are put back, the turnbuckle is screwed up and the tire is ready for inflation.

The turnbuckle is not only a means of adjusting the tire to the rim, or vice versa, but it assists greatly in both the detaching and attaching processes. Again, by reversing the ring so as to take the clincher as well as the Dunlop type, the turnbuckle works on exactly the same principle, and the adaptability to both types is the fundamental basis of the Hartford universal rim.

TO USE KNOX AUTOS FOR MAIL COLLECTION.

BALTIMORE, Sept. 3.—The United States Post Office Department will begin on October 1 its automobile experiment in the collection of mail from letter boxes in this city. Two specially-constructed Knox machines will be used, and in the event the trial is successful the service will be extended to other large cities. The Automobile Outing and Transportation Company will furnish the vehicles to be used in the test. Baltimore was selected because it is the first city in which a contract for the horse-drawn wagons at present in use will terminate, and because the nature of the streets presents unusual conditions for automobiles.

NEWS AND TRADE MISCELLANY.

The Salt Lake Automobile Company, of Salt Lake City, a company recently formed, has voluntarily assigned, in favor of its creditors.

The Automobile Parts and Equipment Company, of Chicago, has leased the old Chicago orphan asylum property, at 2,228 Michigan avenue, for a term of two years.

The George F. Scott Motor Company, eastern agents for the Glide, is now located in his new home at 1720-22 Broadway, New York City, where he has a garage, repair shop, and salesrooms.

The National Carbon Company, of Cleveland, O., will be glad to send a copy of "Kinks," a book dealing with ignition battery matters, to automobilists who will fill out the coupon in the company's advertisement in this issue.

The City Council of Dallas, Tex., has recently purchased a 12-horsepower Franklin for the use of the fire chief. By means of the automobile alarms are answered much more promptly than formerly with the horse and buggy.

The American Auto Company, of Cleveland, has closed contracts for the erection of its new store and shop building, at the corner of St. Clair avenue and Ontario street, that city, which will be two and one stories in height, and be 22 by 114 feet in size.

Fickling & Company, of 154 East Fifty-seventh street, New York, have purchased the Automobile Cover and Top Company, of New York. The plant has been enlarged, to facilitate building large automobile bodies, in addition to upholstering and top making and the handling of automobile accessories.

Percy Owen, New York agent for the Aerocar, recently missed the road when out with a party of five in an Aerocar, and struck a hill that was so steep, he states, that when the car got to the top it slid down the other side in the clay of the road. The car came through the unexpected test with flying colors.

C. A. Hudson, a well known New Yorker, recently made a trip in his Oldsmobile from the Metropolis to Montauk Point, L. I., and return. Many automobilists have been satisfied with returning from the point by rail, the latter part of the 125 miles being almost impassable, on account of the loose sand.

The Hartford Suspension Company, of New York, manufacturers of the Hartford shock absorbers, states that a western automobilist has fitted his car with solid tires and Hartford suspensions, and finds that the suspensions counteract the tendency of the solid tires to skid, and add greatly to the comfort of the car.

The Barnett-Jackson Company, New York City agents for the Dorris and Chadwick cars, are now comfortably located in their enlarged quarters on Fifty-fourth street, near Broadway, and nearly opposite the new A. C. A. clubhouse. A spacious salesroom, small repair shop, and storage for nearly a score of cars are now included.

The Tubaphone Manufacturing Company, of Indianapolis, Ind., manufacturers of exhaust-operated signal horns, has purchased the plant and good-will of the Miller-Hopkins Manufacturing Company, and has added several new models of the tubaphone to its line. The company states that it is now in a position to make prompt shipments.

The Rossel Company of America, which has temporary offices in the Knickerbocker Building, Thirty-ninth street and Broadway, New York City, has 1907 Rossel models ready for inspection. The Rossel cars are particularly known for hill-climbing ability, and recently three cars of this make accomplished a clean sweep of the events held up Le Ballon d'Alsace, a steep mountain in the east of France.

Among those interested in the Adirondack Murray Memorial Association, the object of which is to perpetuate the memory of the famous guide and exploiter of the Adirondacks, is Col. A. A. Pope, who is one of the trustees of the association. It is intended to erect a suitable monument at Mr. Murray's burial place, preserve the old homestead at Guilford, Conn., assist in the education of his daughters, and promote the sale of his books.

The Noera Manufacturing Company, of Waterbury, Conn., manufacturers of automobile sundries and other specialties, has acquired the plant of the Rogers & Hamilton Company, of that city, and it is now being overhauled and put into shape to meet the requirements of the purchaser. The Noera Company expects to take possession in about a month. The new plant will materially enlarge the company's facilities.

Owing to the good work of the American Motor Car Manufacturers' Association, most railroads are now making their box-car doors wider than formerly, thus permitting automobiles to be loaded without difficulty. Doors from six to seven feet wide will be fitted to new cars being built. The old practice of "knocking down" cars for shipment, because they could not be got through the narrow doors, was a great waste of time and money.

The Atlantic Motor Car Company has relinquished the Autocar for the Metropolitan district, taken the Stoddard-Dayton, and will soon be located in its new store at 1655 Broadway. A. H. Whiting has been elected vice-president of the Atlantic Company, which includes P. F. Rockett, recently of the Zim-Rock Motor Company, last year's New York agents for the Stoddard-Dayton. E. R. Newton, of course, remains as president. The combination all around is considered one of the strongest in the Metropolitan district.

Dust prevention on public highways is the subject of much importance to automobilists, and the latest alleviation of the nuisance is in the use of calcium chloride, which it is claimed will make a road remain damp and dustless for a long period, because the material has a strong affinity for moisture, absorbing during the night whatever moisture it may have lost during the day. The Carbondale Chemical Company, Carbondale, Pa., will supply further information. The suggestion originally came from England, where calcium chloride has been successfully tried.

Very different from the ordinary run of advertising matter is the folder that is being sent out to prospective purchasers and interested persons by the Buckeye Manufacturing Company, of Anderson, Ind., builders of the Lambert friction drive cars. The folder consists of a single large sheet triple folded, and inside are photographs of two of the Lambert models, mounted on dark gray mats, together with brief descriptions of the cars printed in gold on

rough surfaced white paper. The effect of the whole is excellent, and can hardly fail in its mission of calling favorable attention to the Lambert car.

Automobilists who frequent the famous roads of Long Island—which means practically all the automobilists in the metropolitan district—will be glad to know that a number of the death-trap grade crossings of the Long Island Railroad are to be abolished. After personal investigation and hearings on the matter, the railroad commission has decided to recommend the abolition of six out of thirteen grade crossings that the commission was asked to close. The crossings involved are at the Old Westbury Road in North Hempstead and at New York avenue and Long Swamp Road in Huntington, at Eastport in Southampton, at Horseblock Road in Brookhaven, and at Thicket Road in Brookhaven. The New York avenue and the Old Westbury Road crossings will be carried under or over the tracks, while the others will be discontinued.

NEW AGENCIES ESTABLISHED.

The agency for the Stevens-Duryea cars for Nashville, Tenn., has been secured by E. E. Sweeny, of that place.

The New York branch of the Glide Company, of Peoria, Ill., will open a salesroom for handling Glide cars early this month.

PERSONAL TRADE MENTION.

H. S. Firestone, president of the Firestone Tire & Rubber Company, Akron, O., accompanied by Mrs. Firestone, recently sailed for Europe, to be gone several weeks on a pleasure tour.

Benjamin Briscoe, president of the Maxwell-Briscoe Company, of Tarrytown, N. Y., has returned from a tour of agency inspection, and reports active business in moderate priced cars, and preparations for a heavier demand next season.

W. W. Taxis, the well known Philadelphian, has accepted a position of sales manager of the Crawford Automobile Company, of Hagerstown, Md. Mr. Taxis has entered upon his duties, and early results are anticipated.

C. H. Tangeman, president of the Hol-Tan Company, New York City, has returned to the Metropolis in a 35-horsepower Fiat, via the Berkshire Hills. Mr. Tangeman has been summering at the Hotel Frontenac, in the Thousand Islands, where he raced his motorboat, the *Sheeter*, with much success.

R. M. Owen, sales manager of the Reo Motor Car Company, who has his headquarters in New York City, recently returned from a trip to the Reo factory at Lansing, Mich. Mr. Owen reports agencies everywhere specifying large orders for immediate delivery, notably for the five-passenger light touring car.

C. S. Henshaw, 286 Columbus avenue, Boston, who has represented the E. R. Thomas Motor Company for the past six years, is now open to take on one or two first-class touring cars for Boston and vicinity. Mr. Henshaw has disposed of all cars that were allotted to him for New England for the Thomas Company.

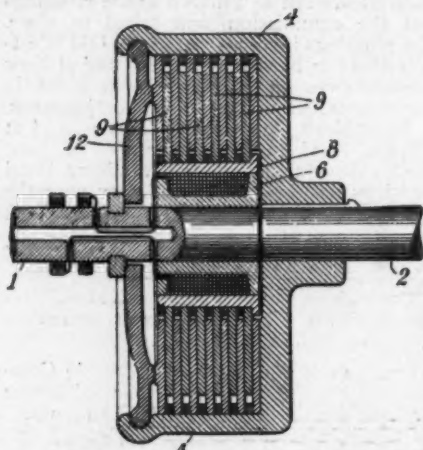
Stanley Gilliard, of the Hartford Rubber Works, has been advised by his physician to seek a new climate on account of incipient lung trouble, and an opportunity to fill a vacancy in the company's Denver office made the matter a simple one. Mr. Gilliard will move out to Colorado, and there represent the Hartford company.

Patents

Magnetic Clutch.

No. 828,647.—L. T. Gibbs, of Hempstead, N. Y.

This is a multiple-disk clutch, in which an electro-magnet is employed to apply pressure to cause the discs to grip. In the drawing, 1 and 2 are the driving and driven



GIBBS' MAGNETIC DISK CLUTCH.

shafts, of which 1 carries the spool core 6 disks of the magnet and 2 carries the shell 4 of the clutch. A sleeve 8 rigid with 6 carries the alternate disks 9 9, and the clutch is engaged by the electro-magnet attracting the radial levers 12, of which a series surrounds the shaft. These levers are pivoted at their outer ends, and afford a path for the lines of force which pass through 6 and 4, thus completing the magnetic circuit. The shape of the levers is such that they are held released by centrifugal force when the magnet is not energized.

Differential Construction.

No. 827,095.—E. P. Gray, of Cincinnati, Ohio.

This is a differential casing, split centrally at right angles to the axle, and having a sprocket wheel secured to it by means of key-like formations, which relieve the holding-together bolts of stresses due to the driving action.

Wrist Pin Locking Device.

No. 828,402.—H. M. Hart, of Philadelphia.

A device used with wrist pins having one end larger in diameter than the other. It consists of a clip similar to a ball retainer, which is sprung into a groove in the hole bored in the piston for the wrist pin, the groove being just outside the large end of the pin.

Sheet Metal Water Jacket.

No. 828,656.—T. Huber, of Billancourt, France.

A detail patent on a method of securing copper water jackets to cylinders. The

cylinder or head is flanged, and a corresponding flange on the jacket is clamped by a follower ring against the cylinder flange. A corrugation in the jacket, to hold the follower ring against the copper flange before assembling, is specified.

Heat Radiating Pin.

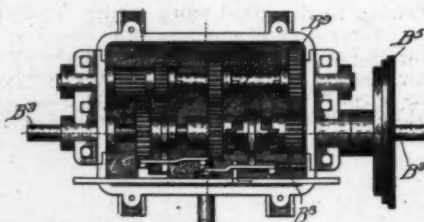
No. 82,732.—H. A. Knox, of Springfield, Mass.

This is a pin formed in one piece or several, and threaded into the cylinder wall. It is split into two or three portions, which are spread slightly to afford additional surface for convection.

Transmission Gear.

No. 826,851.—M. Hendrickson, of Chicago, Ill.

The shaft B^3 is driven through the clutch B^2 by the engine shaft (not shown). Pinion B^2 is carried on a loose sleeve connected with the clutch, and for the direct drive it engages the claw clutch B^{10} , which slides on a short, squared portion of the shaft B^2 . For the intermediate speed B^{10} engages B^{11} , and the transmission is from B^2 through B^2 and B^{10} . For the first speed B^{11} , which is splined on B^2 , is shifted to engage B^{12} , and for the reverse it engages B^{13} . A gear-



HENDRICKSON'S TRANSMISSION GEAR.

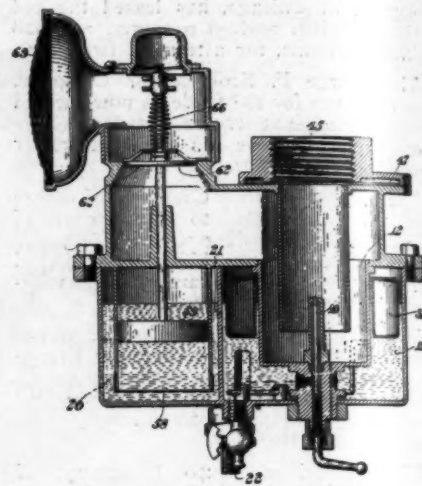
shifting lever working in an H slot actuates one or the other sliding set, according to which slot it is in.

Carbureter.

No. 829,345.—A. W. Menns, of Malden, Mass.

In this carbureter the air enters at 69 and passes downward through the automatic valve 62, then down through the annular passage 12 and up past the spray nozzle 40 and the throttle valve 47, going out at 45. The gasoline enters at 22, where it passes a weighted valve controlled by the float 37 through connections not seen. The especial feature of the carbureter is the

liquid dashpot, which, in connection with the spring 66, governs the movements of the valve 62. Separate from the float chamber 19 is a chamber 20, connected with 19 only through the small orifice 21, a little below the normal gasoline level. This chamber 20 communicates through a



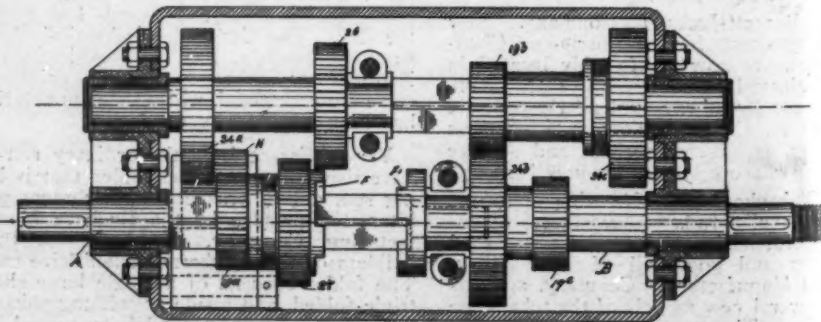
MENNS' AUTOMATIC CARBURETER.

slightly larger orifice 58 with a closed cylinder, in which moves a piston 59 connected to the stem of valve 62. This piston is not a tight fit, but is fitted accurately enough to force some of the gasoline below it to escape at 58 when it goes down under the influence of a strong air stream above. This raises the gasoline level in 20, and causes gasoline to flow slowly through 21 into the float chamber. Rising of 59, due to reduced suction, causes gasoline to flow back from 19 to 20.

Speed Changing Gear.

No. 827,454.—H. W. Leonard, of Bronxville, N. Y.

This is a speed-changing gear, giving four speeds and one reverse, with the direct drive on the third instead of on the fourth gear. Power is applied to shaft A, and delivered through shaft B, and for the direct drive these are coupled through the claw coupling F F'. For the first speed pinion 19a engages 34a, and for the intermediate speed 27 engages 26. For the fourth speed 27 still engages 26, but 19b is shifted out of mesh with 34b, and 34c is engaged with 19c, thus gearing B to a higher speed.



LEONARD'S CHANGE SPEED GEAR WITH DIRECT DRIVE ON THIRD SPEED.